THE RUBBER AGE AND TIRE NEWS

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March 10th
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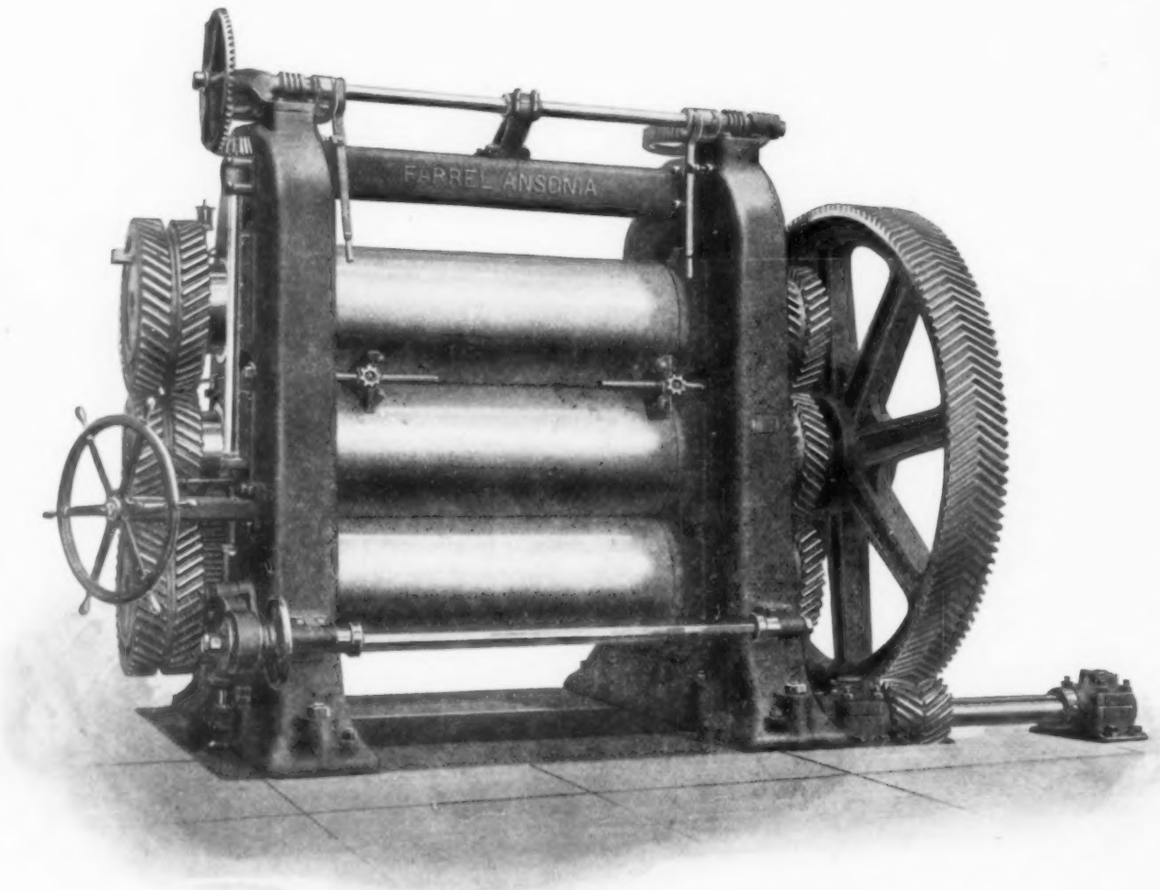

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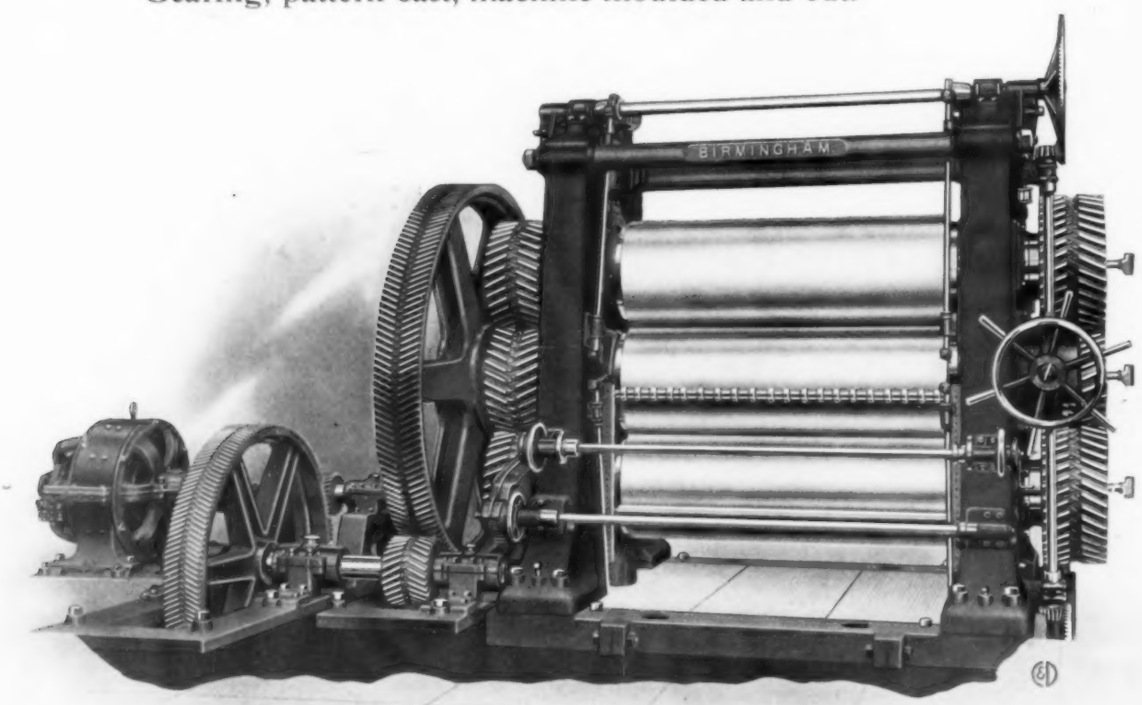

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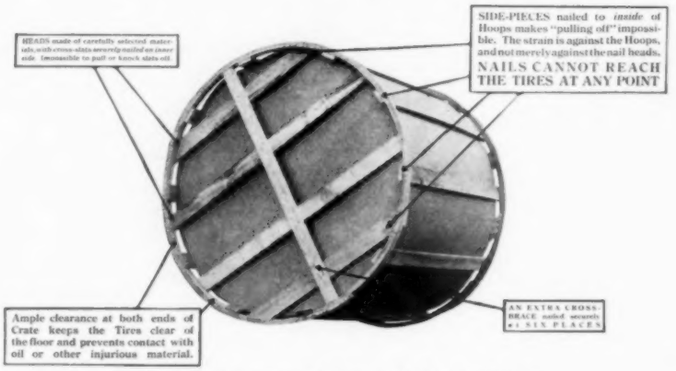
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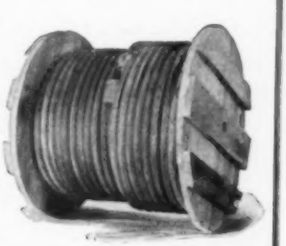

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THE RUBBER AGE AND TIRE NEWS

MARCH 10, 1918 VOL. II. NO. 12

Member of the Associated Business Papers, Inc.

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THE
RUBBER AGE
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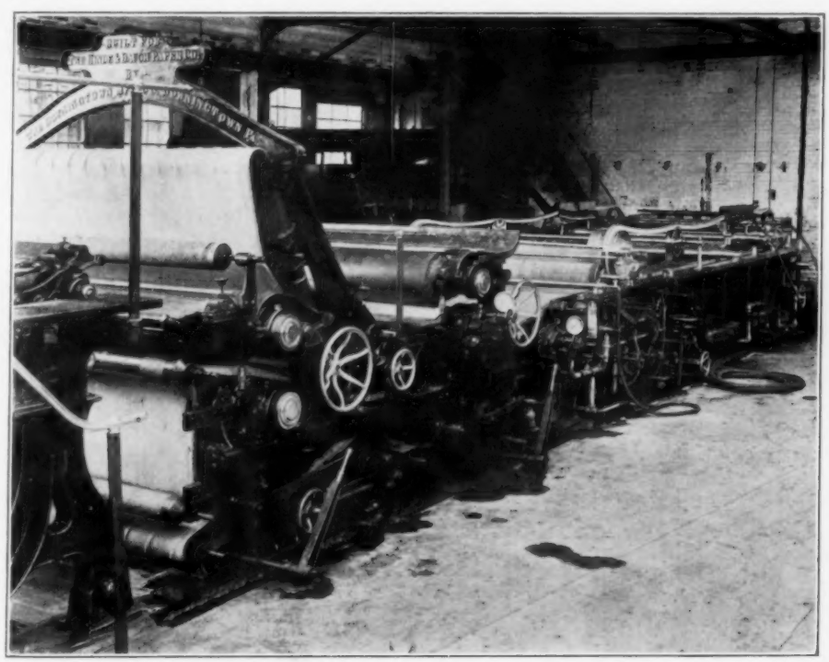
Rubber and Papermaking

By John W. Brassington

The uninitiated one may resent the coupling of terms forming the title of this article: as well talk of "Cabbages and Kings," he might remark in vocative contempt; yet, even as kings eat cabbages, so the art of papermaking consumes rubber. Aye! further than this, the quality of the rubber so absorbed is as much a determinant of the quality of paper produced as the quality of the cabbage devoured might determine the physical well-being of the royal consumers.

We will not detail the uses of rubber in a paper mill that are not peculiar to papermaking, as in packing, pumps, valves, etc.; rather, we will confine our studies to the use of rubber as an aid to papermaking.



Papermaking Machine Showing Deckle Straps

Rubber is the reverse of useful as a component part of the paper produced, and great care is taken that no rubber bands or rubber parts are included in the shavings and scraps of old paper that are often used in the furnish to the beaters, where the "stuff" of which paper is made is prepared.

The "stuff" that flows from the flow-box onto the paper machine looks like milky water, and in the case of high speed news machines actually contains only one-third of one per cent of papermaking material, the remaining ninety-nine and two-thirds per cent being water. This milky stream flows onto a continuously moving endless belt of very fine mesh wire called the Fourdrinier Wire: the wire runs over a table of rolls placed close together, and the water passes through the mesh wire leaving the cellulose fibers on the upper surface; the moisture of the forming sheet is then further decreased by the suction boxes over which this wire belt passes: these boxes, their interior being kept below atmospheric pressure by vacuum pumps, gulp enough moisture through the wire to leave the nascent paper strong enough to pass the couch rolls as a sheet capable of being taken by hand to the press, and from thence to the dryers.

A moment's thought will serve to convince that a stream of water containing only a very small percentage of solid matter cannot proceed down a continuous belt without spilling over the sides, unless contained thereon by side retainers at least as deep as the stream itself. These retainers, called deckle straps, are rubber bands of rectangular section, the depth and width dimensions varying from 1¼ in. to 3 in., according to the size and speed of the paper machine; the higher the speed, the deeper the stream of "stuff" that flows onto the Fourdrinier, and therefore the deeper the deckle straps.

Use of Rubber Deckle Straps

Rubber is used for this essential duty on a paper machine because it forms a more intimate contact with the moving wire, adapts itself to any lack of uniformity, and insures a longer life to the expensive Fourdrinier Wire because a belt made of it will drive the deckle pulleys more positively than a belt made of any other substance less capable of clinging to the pulley rims, and of giving as large an arc of contact.

Deckle Straps must be of pure rubber, and are therefore very expensive. The purchase of inferior grade deckle straps always results in an unpleasant memory in the mind of

the buyer long after he has forgotten the original cheap price he paid. It is poor business in the long run to sell inferior rubber deckle straps; better sell none than cause the blame of the purchaser to descend on your shoulders for his own penurious and ignorant purchase.

Plastometer Readings		Rubber Manufacturers and Their Equivalent Grades						
1/8 in. Ball	1/4 in. Ball	Company No. 1	Company No. 2	Company No. 3	Company No. 4	Company No. 5	Company No. 6	Company No. 7
15	12	5½						
20	15	5½						
25	18	...	B.H.H.	3				
30	22	...	B.H.H.	3	Spec. P.			
35	27	5	B.H.H.	3				
40	31	5	B.H.H.	2½	5¾	A. 3		
45	36	5	B.H.	2½	5¾	A. 3		
50	40	4¾	B.H.	2	5½	A. 11		
55	45	4¾	B.H.	2	5½	A. 11		
60	50	4¾	B.H.	2	5½			
65	54	4½	B.M.L.C.	1¾	4¾	...	T. 22. W. 2072	
70	58	4½	B.M.L.C.	1¾	4¾	...	No. 6333	
75	61	4½	B.M.L.C.	1¾				
80	65	Fulton Soft	B.M.	1½				
85	68	4	B.M.	1½	...	...	...	No. 57
90	73	4	B.M.	1½				
95	77	...	...	1½				
130	103	3	1131					
140	111	3						
150	117	D 2						
170	135	...	...	S.B.				
*180	145	...	...	S.B.	0			
*190	156	...	...	...	0			
*200	170	0	B.C.	...	00			
*210	185	0	B.C.	...	00			

* Pure Rubber.

PLASTOMETER READINGS AND MANUFACTURER'S GRADES

Many of the press rolls of a paper machine are covered with rubber. From the baby press rolls of a cylinder machine to the bottom third press of a high speed news, the density and quality of the rubber coverings may vary from the soft resiliency of pure rubber to the indurated elasticity of what we call in the paper trade, the vulcanized rubber coverings of a lower press roll.

Many difficulties beset the papermaker because of the impossibility of accurately determining the density, quality and elasticity of the rubber coverings he uses. Various instruments have been designed and used with partial success, all being based on the penetrability of the rubber under standard time and pressure conditions.

The table given here is one compiled by a well known firm of paper machine manufacturers. It is a record of the readings made by means of the instrument they used, which is called the Plastometer. This table is given because of its interest to the rubber trade in general, it giving the only comparison that the writer knows of between the various standard grades of some of the most prominent manufacturers of rubber products.

The various measuring instruments so far produced for testing the quality of rubber fail without exception to detect the difference between a hardness due to age and a hardness due to predetermined preparation.

Rubber Press Rolls

The following explanation of the use of rubber covered press rolls in a paper machine, and the effect of the quality of the rubber, not only on the life of the coverings, but also on the quality and quantity of paper produced, may awaken the interest of rubber manufacturing firms in the need of paperdom for a definite measure of the quality of any given grade of rubber.

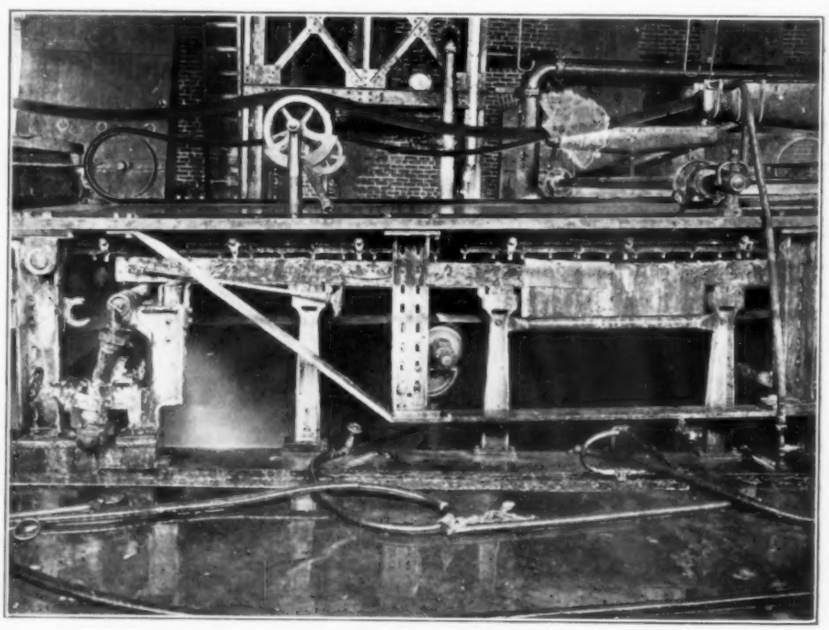
Paper leaving the couch rolls of the Fourdrinier Machine is carried by felts between the press rolls, whose duty it is to squeeze out more of the contained water, and also to form the surface of the paper. The lower press rolls are nearly always rubber covered.

Press rolls vary in diameter from 12 in. to 36 in., in length of face from 60 in. and less to 232 in. and probably more in the near future.

In order to preserve a uniform thickness of sheet, the upper and lower press rolls at the line of contact where the paper is heated must exert a constant and uniform pressure on one another from end to end. Such a pair of press rolls can be machined so their diameter will not vary beyond a tolerance of three one-thousandths of an inch, yet when placed in the paper machine in perfect line with each other and their respective bearings, they will sag in the center because of their own weight. This tendency to sag is generally corrected by crowning the bottom roll so that the diameter measured at the center is larger than the diameter measured at the ends by the amount the sag roll will sag under average working conditions.

If a paper machine is used for making different weights and grades of paper, the weights and levers placed on the journals of the upper roll in order to control the pressure between the two rolls can be changed to insure a more perfect line of contact between the rolls in case the average actual crown does not suit any given working condition.

In the old days when paper machines were narrow and ran slowly, the rolls were made of wood and of brass, and the crowning was not of much importance, the felts carrying the paper acting as a thickness gauge. As machines widened, the life of the

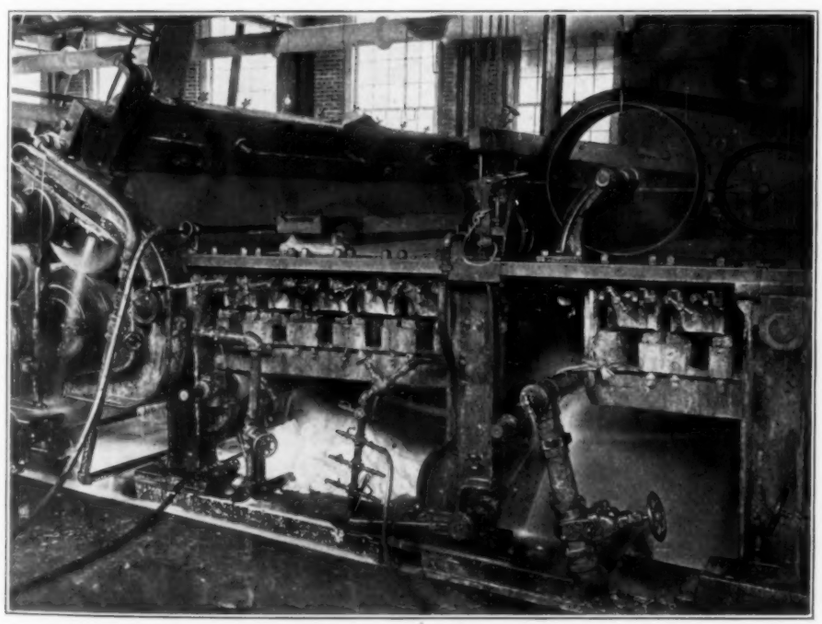


A CLOSER VIEW OF DECKLE STRAPS ON PAPERMAKING MACHINE

expensive felts became shorter, therefore, rubber and other coverings were introduced to save the felts. It was soon found, as paper machines grew still wider, that the crowned rubber roll is superior to any other crowned roll in that the elasticity of the rubber will correct for faulty crowning or permit of a wider range of adjustment of pressure between the rolls by means of the levers and weights before mentioned.

It is now one of the earmarks of a practical papermaker, so to speak, an identification of his ability, if he can recommend a certain crown for a given press roll after he has tested the density of the covering with his thumb nail. The writer does not decry that quality of rare judgment which is developed by the practical man by years of intimate hard labor with a given product, but so often the charlatan appears with all the external signs of wisdom and experience, and his thumb nail points to disaster without any record being made of the fact that it so pointed.

Again when a rubber covered press roll is incorrectly crowned, the error made can be corrected in practice by increasing or decreasing the pressure between the rolls; in case of too great a crown a greater pressure is required to maintain a uniform line of contact, and therefore a uniformly dried and pressed sheet of paper from edge to edge. This increased pressure due to errors in crowning and



VIEW OF RUBBER-COVERED ROLLS IN PAPERMAKING MACHINE

in thumb nail testing methods often causes a definite shortening of the life, not only of the felts, but also of the rubber covering, which quickly corrugates under the excessive pressure and drag of the quickly turning rolls. In such a case the firm furnishing the rubber coverings is blamed for faults that really result from the inaccuracy of the thumb nail test.

Non-Deflecting Press Rolls

So serious a matter is the question of press roll crownings and coverings that many attempts have been made in late years to design rolls that may be considered non-deflecting in that the method of construction transfers the stress on the roll beams from the envelope to the shaft, so maintaining a straight line of contact where the paper passes between the rolls. So many mechanical difficulties arise from the lack of alignment of the shaft that this method of eliminating errors in the crowning of press rolls has not been to the best of the writer's knowledge an unqualified success in any one case.

It is part of the penalty we pay in this "country of hustle" that we cannot give the time to correct the faults that so often detract fatally from our ability to compete with more careful nations. Should the rubber companies tackle such a problem as this article has tried to describe, by studying the real difficulties of the papermaker by the light of their own experience, the writer has sufficient faith in their manufacturing ability and integrity to see the end of the thumb nail method of determining the value and quality of a rubber covering on paper machine press rolls.

The adoption of standard measures of grades common to all rubber manufacturing concerns seems in line with the "spirit of the times." The writer as an engineer would like to be able to specify the quality of any rubber he might need in terms whose meaning would be clear to all the trade. Why should grade 4¾ of one firm be the same as grade B.H. or 2 of other firms; is the rubber trade so obsessed by the old spirit of destructive competition and suspicion that they still indulge in the near obsolescent habit of trade secrets?

It is not a method in tune with the twentieth century that any one firm should preempt for its own benefit any methods or measures that could be of benefit to all. There can be tests for age, quality, and result of treatment of all rubbers; the effect of temperature and humidity on such tests should be a matter of common knowledge and record. In this manner not only the purchaser, but the seller, could make certain that the basis of their respective bargainings would be of good foundation, worthy of themselves and their future mutual relationships.

Need of Accurate Testing

Every rubber testing instrument the writer knows measures the quality of rubber by the degree of penetrability under pressure. It is possible that a truer value of the elastic qualities of a rubber could be measured by an instrument similar in design to the Schleroscope, which is used in the metal trades for measuring the hardness of metal by the rebound of a steel ball dropped on the metal's surface from a given height.

If we could obtain a measure of rubber quality stated as a formula with corrective factors for heat and humidity of atmosphere, what a help it would be in checking the quality of selected rubber goods. Even if such a measure of quality that might ultimately be selected, after experiment should fail to absolutely register quality, it would undoubtedly be of great comparative value. Many a faulty instrument of precision has, after being in constant use with careful records being kept of its readings, pointed out the way not only to obtain the results aimed at by reference to past records as compared with any certain one under consideration, but has indicated the proper design of instrument to replace itself.

Should rubber manufacturers mutually agree to adopt a single standard measure of quality based on tests with a selected instrument in a specified way, there is no doubt that the following results would be obtained: first, a finer conception of rubber quality; second, a recognized measure of quality known to all; and lastly, a more definite knowledge by outsiders of the results of age, humidity, and faulty preparation.

Census Report on Rubber Industry

A comprehensive report on the American rubber industry in 1914 has just been issued by the Department of Commerce, Washington, D. C. This report presents statistics relative to plants and factories engaged primarily in the manufacture of rubber or products in which rubber is the principal material. It divides the industry into three groups: (1) Plants whose principal products were rubber belting and hose; (2) plants making rubber boots and shoes; and (3) plants engaged primarily in the manufacture of all other kinds of rubber products. The first group is divided into sub-groups, those plants whose chief product was belting and those making hose as a primary product. The third group consists of establishments manufacturing rubber tires of all kinds, rubber packing, rubber clothing, druggists' and stationers' sundries, and other articles made from rubber.

TABLE 1

	Total for the Industry.	Establishments Engaged Primarily in the Manufacture of— Belting and Hose, Rubber. Belting.	Hose.	Boots and Shoes, Rubber.	Rubber Goods, not Elsewhere Specified.
Number of establishments	342	7	11	23	301
Persons engaged in the industry	88,821	2,997	3,208	20,359	62,257
Proprietors and firm members	87	.....	.....	2	85
Salaried employes	14,712	555	535	1,670	11,952
Wage earners (aver. No.)	74,022	2,442	2,673	18,687	50,220
Primary horsepower	199,543	10,506	12,489	24,621	151,927
Capital	$267,671,422	$11,249,598	$11,187,324	$46,051,464	$199,183,036
Salaries and wages	60,445,980	2,424,642	2,170,973	11,944,733	43,905,632
Salaries	16,278,578	973,080	720,342	1,958,279	12,626,877
Wages	44,167,402	1,451,562	1,450,631	9,986,454	31,278,755
Paid for contract work	408,851	.....	1,200	39,140	368,511
Rent and taxes (including internal revenue)	2,226,322	81,857	83,101	345,678	1,715,686
Cost of materials	163,034,713	5,926,568	7,040,436	23,956,036	126,111,673
Value of products	300,993,796	11,580,405	11,980,484	53,822,123	223,610,784
Value added by manufacture (value of products less cost of materials)	137,959,083	5,653,837	4,940,048	29,866,087	97,499,111

The statistics further show a decrease in the number of proprietors the chief product of 23 establishments, and other rubber goods were made in 301 establishments. The most important branch of the industry was that designated as "rubber goods, not elsewhere specified" (group 3), 74.3 per cent of the total value of products being reported from this branch.

Comparison with Earlier Censuses

Table 2 summarizes the statistics of establishments engaged in the rubber industry as a whole, together with separate figures for the three branches of the industry, from 1879 to 1914, and gives percentages of increase, and shows that the value of the products of the industry increased from $25,309,648 in 1879 to $300,993,796 in 1914, or more than elevenfold. The increase for the decade 1904 to 1914 was 103.4 per cent, while for the latter half of this decade the increase was 52.5 per cent. Each branch of the industry shows a substantial increase between 1909 and 1914, rubber products of group 4 showing the largest percentages of increase. The value of the product for the belting and hose industry increased 22.5 per cent between 1909 and 1914; rubber boots and shoes, 8.2 per cent, and rubber goods, 74.1 per cent.

TABLE 3

Industry and class	Census year	Persons engaged in the industry. Total.	Male.	Female.	Per cent of Total. Male.	Female.
RUBBER GOODS—ALL BRANCHES	1914	88,821	70,716	18,105	79.6	20.4
	1909	56,059	42,702	13,357	76.2	23.8
Proprietors and officials	1914	1,599	1,570	29	98.2	1.8
	1909	1,118	1,094	24	97.9	2.1
Proprietors and firm members	1914	87	82	5	94.3	5.7
	1909	103	93	10	90.3	9.7
Salaried officers of corporations	1914	514	503	11	97.9	2.1
	1909	348	344	4	98.9	1.1
Superintendents and managers	1914	998	985	13	98.7	1.3
	1909	667	657	10	98.5	1.5
Clerks and other subordinate salaried employees	1914	13,200	9,900	3,300	75.0	25.0
	1909	5,677	4,256	1,421	75.0	25.0
Wage earners (average number)	1914	74,022	59,246	14,776	80.0	20.0
	1909	49,264	37,352	11,912	75.8	24.2
16 years of age and over	1914	73,376	58,907	14,469	80.3	19.7
	1909	48,393	36,903	11,490	76.3	23.7
Under 16 years of age	1914	646	339	307	52.5	47.5
	1909	871	449	422	51.5	48.5
BELTING AND HOSE, RUBBER	1914	6,205	5,284	921	85.2	14.8
	1909	5,876	5,294	582	90.1	9.9
Proprietors and officials	1914	116	116	.....	100.0	.....
	1909	94	94	.....	100.0	.....
Proprietors and firm members	1914	.....	.....	.....	.....	.....
	1909	1	1	.....	100.0	.....
Salaried officers of corporations	1914	46	46	.....	100.0	.....
	1909	32	32	.....	100.0	.....
Superintendents and managers	1914	70	70	.....	100.0	.....
	1909	61	61	.....	100.0	.....
Clerks and other subordinate salaried employees	1914	974	756	218	77.6	22.4
	1909	651	516	135	79.3	20.7
Wage earners (average number)	1914	5,115	4,412	703	86.3	13.7
	1909	5,131	4,684	447	91.3	8.7
16 years of age and over	1914	5,099	4,401	698	86.3	13.7
	1909	5,094	4,664	430	91.6	8.4
Under 16 years of age	1914	16	11	5	68.8	31.2
	1909	37	20	17	54.1	45.9
BOOTS AND SHOES, RUBBER	1914	20,359	12,407	7,952	60.9	39.1
	1909	18,899	11,680	7,219	61.8	38.2
Proprietors and officials	1914	160	153	5	96.9	3.1
	1909	194	191	3	98.5	1.5
Proprietors and firm members	1914	2	2	.....	100.0	.....
	1909	.....	.....	.....	100.0	.....
Salaried officers of corporations	1914	44	44	.....	100.0	.....
	1909	44	44	.....	100.0	.....
Superintendents and managers	1914	114	109	5	95.6	4.4
	1909	150	147	3	98.0	2.0
Clerks and other subordinate salaried employees	1914	1,512	1,065	456	69.8	30.2
	1909	1,093	813	280	74.4	25.6
Wage earners (average number)	1914	18,687	11,196	7,491	59.9	40.1
	1909	17,612	10,676	6,936	60.6	39.4
16 years of age and over	1914	18,440	11,094	7,346	60.2	39.8
	1909	17,162	10,451	6,711	60.9	39.1
Under 16 years of age	1914	247	102	145	41.3	58.7
	1909	450	225	225	50.0	50.0
RUBBER GOODS, NOT ELSEWHERE SPECIFIED	1914	62,257	53,025	9,232	85.2	14.8
	1909	31,284	25,728	5,556	82.2	17.8
Proprietors and officials	1914	1,323	1,299	24	98.2	1.8
	1909	830	809	21	97.5	2.5
Proprietors and firm members	1914	85	80	5	94.1	5.9
	1909	102	92	10	90.2	9.8
Salaried officers of corporations	1914	424	413	11	97.4	2.6
	1909	272	268	4	98.5	1.5
Superintendents and managers	1914	814	806	8	99.0	1.0
	1909	456	449	7	98.5	1.5
Clerks and other subordinate salaried employees	1914	10,714	8,088	2,626	75.5	24.5
	1909	3,933	2,927	1,006	74.4	25.6
Wage earners (average number)	1914	50,220	43,638	6,582	86.9	13.1
	1909	26,521	21,992	4,529	82.9	17.1
16 years of age and over	1914	49,837	43,412	6,425	87.1	12.9
	1909	26,137	21,788	4,349	83.4	16.6
Under 16 years of age	1914	383	226	157	59.0	41.0
	1909	384	204	180	53.1	46.9

and firm members, due to the decrease in the number of small establishments operated by individuals or firms, and also to the fact that some establishments of this class were incorporated during the period between the censuses. In such cases the class reported as proprietors or firm members at one census might be returned as salaried employees at a subsequent enumeration.

In addition to the $300,993,796 reported as the total value of products for the rubber industry in 1914, rubber goods to the amount of $752,503 were manufactured as subsidiary products by 19 establishments engaged primarily in other industries.

No distribution by states of the value of products for the industry as a whole is given for the reason that such a distribution might possibly disclose the operations of individuals in some states. Table 10, however, gives for 1914 the value of products for each branch of the industry, together with separate totals for some states.

Persons Engaged in the Industry

Of the 88,821 persons engaged in the rubber industry in 1914, as shown by Table 3, 79.6 per cent were males and 20.4 per cent were females, the proportion of males being larger by 3.4 per cent than in 1909. The wage earners formed 83.3 per cent of all persons engaged in the industry, and the average number increased by 50.3 per cent between 1909 and 1914. For

TABLE 2

	Number or Amount.						Per Cent of Increase.				
RUBBER GOODS—ALL BRANCHES.†	1914.	1909.	1904.	1899.	1889.	1879.	1909-1914.	1904-1909.	1899-1904.	1889-1899.	1879-1889.
Number of establishments..	342	267	265	301	167	104	28.1	0.8	—12.0	80.2	60.6
Persons engaged in the industry	88,821	56,059	47,676	(*)	(*)	(*)	58.4	17.6	...	...	...
Proprietors and firm members	87	103	105	(*)	(*)	(*)	—15.5	—1.9	...	...	...
Salaried employes	14,712	6,692	3,698	2,505	859	(*)	119.8	81.0	47.6	191.6	...
Wage earners (av. No.)	74,022	49,264	43,873	36,566	20,152	11,789	50.3	12.3	20.0	81.5	70.9
Primary horsepower	199,543	122,436	86,808	71,169	27,125	(*)	63.0	41.0	22.0	162.4	...
Capital	$267,671,422	$162,144,564	$98,979,636	$78,463,771	$36,764,825	$8,974,187	65.1	63.8	26.1	113.4	309.7
Salaries and wages	60,445,980	32,977,676	24,623,078	18,575,728	9,526,909	4,051,431	83.3	33.9	32.6	95.0	135.1
Salaries	16,278,578	7,840,700	4,538,912	3,149,155	(*)	(*)	107.6	72.7	44.1	...	...
Wages	44,167,402	25,136,976	20,084,166	15,426,573	(*)	(*)	75.7	25.2	30.2	...	...
Paid for contract work	408,851	25,099	76,188	62,861	(*)	(*)	1,529.0	—67.1	21.2	...	...
Rent and taxes (including internal revenue)	2,226,322	851,213	‡643,127	‡653,321	(*)	(*)	161.5	...	...	...	...
Cost of materials	163,034,713	122,745,102	80,002,476	60,240,559	26,243,853	16,527,220	32.8	53.4	32.8	129.5	58.8
Value of products	300,993,796	197,394,638	148,015,391	99,880,693	42,853,817	25,309,648	52.5	33.4	48.2	133.1	69.3
Value added by manufacture (value of products less cost of materials)	137,959,083	74,649,536	68,012,915	39,640,134	16,609,964	8,782,428	84.8	9.8	71.6	138.7	89.1
BELTING AND HOSE, RUBBER.											
Number of establishments..	18	18	19	18	17	2	...	...	...	...	...
Persons engaged in the industry	6,205	5,876	4,210	1,971	(*)	(*)	5.6	39.6	113.6	...	...
Proprietors and firm members	.....	1	.....	3	(*)	(*)	...	...	...	...	...
Salaried employes	1,090	744	512	197	110	(*)	46.5	45.3	159.9	79.1	...
Wage earners (av. No.)	5,115	5,131	3,698	1,771	1,835	364	—0.3	38.8	108.8	—3.5	404.1
Primary horsepower	22,995	17,471	12,343	5,317	4,942	(*)	31.6	41.5	132.1	7.6	...
Capital	$22,436,922	$19,731,968	$13,240,273	$5,493,855	$5,270,068	$265,000	13.7	49.0	141.0	4.2	1,888.7
Salaries and wages	4,595,615	3,492,720	2,612,640	1,254,510	1,043,768	131,721	31.6	33.7	108.3	20.2	692.4
Salaries	1,693,422	1,019,844	807,648	336,319	(*)	(*)	66.0	26.3	140.1	...	...
Wages	2,902,193	2,472,876	1,804,992	918,191	(*)	(*)	17.4	37.0	96.6	...	...
Paid for contract work	1,200	.....	1,515	6,096	(*)	(*)	...	...	—75.1	...	...
Rent and taxes (including internal revenue)	164,958	78,941	‡63,448	‡52,620	(*)	(*)	109.0	...	...	...	...
Cost of materials	12,967,094	10,976,105	9,089,786	4,075,702	3,479,538	863,000	18.1	20.8	123.0	17.1	303.2
Value of products	23,560,889	19,238,324	14,954,186	6,169,044	5,512,840	1,085,000	22.5	28.6	142.4	11.9	408.1
Value added by manufacture (value of products less cost of materials)	10,593,885	8,262,219	5,864,400	2,093,342	2,033,302	222,000	28.2	40.9	180.1	3.0	815.9
BOOTS AND SHOES, RUBBER.					11	9	...	...	...	...	...
Number of establishments..	23	22	22	22	(*)	(*)	7.7	—4.6	33.2	...	...
Persons engaged in the industry	20,359	18,899	19,815	14,877	(*)	(*)	...	...	...	...	...
Proprietors and firm members	2	.....	2	3	(*)	(*)	29.8	...	...	...	...
Salaried employes	1,670	1,287	822	483	9,134	4,662	6.1	—7.3	32.0	57.6	95.9
Wage earners (av. No.)	18,687	17,612	18,991	14,391	9,543	(*)	—4.9	—0.7	4.3	162.2	...
Primary horsepower	24,621	25,903	26,084	25,017	$17,790,970	$2,425,000	4.9	11.3	17.2	89.2	633.6
Capital	$46,051,464	$43,905,368	$39,441,826	$33,667,533	3,966,875	1,469,038	19.9	2.2	38.7	77.1	170.1
Salaries and wages	11,944,733	9,958,995	9,740,807	7,023,818	(*)	(*)	38.4	61.9	46.3	...	...
Salaries	1,958,279	1,414,743	874,001	597,239	(*)	(*)	16.9	—3.6	38.0	...	...
Wages	9,986,454	8,544,252	8,866,806	6,426,579	(*)	(*)	...	...	...	...	...
Paid for contract work	39,140	.....	5,132	.....							
Rent and taxes (including internal revenue)	345,678	266,368	‡164,590	‡197,692	(*)	(*)	29.8	...	...	...	...
Cost of materials	23,956,036	29,377,176	32,000,464	22,682,543	11,650,787	6,023,053	—19.0	—7.6	41.1	94.7	93.4
Value of products	53,822,123	49,720,567	70,065,296	41,089,819	18,632,060	9,705,724	8.2	—29.0	70.5	120.5	92.0
Value added by manufacture (value of products less cost of materials)	29,866,087	20,143,391	38,064,832	18,407,276	6,981,273	3,682,671	48.3	—47.1	106.8	163.7	89.6
RUBBER GOODS, NOT ELSEWHERE SPECIFIED.											
Number of establishments..	301	227	224	261	139	93	32.6	1.3	—14.2	87.8	...
Persons engaged in the industry	62,257	31,284	23,651	(*)	(*)	(*)	99.0	32.3	...	...	...
Proprietors and firm members	85	102	103	(*)	(*)	(*)	—16.7	—1.0	...	...	...
Salaried employes	11,952	4,661	2,364	1,825	319	(*)	156.4	97.2	29.5	194.8	...
Wage earners (av. No.)	50,220	26,521	21,184	20,404	9,183	6,763	89.4	25.2	3.8	122.2	35.8
151,927 79,062	48,381	40,835	Primary horsepower		2,640	(*)	92.2	63.4	18.5	223.1	...
Capital	$199,183,036	$98,507,228	$46,297,337	$39,302,353	$13,703,787	$6,284,187	102.2	112.8	17.8	186.8	118.1
Salaries and wages	43,905,632	19,525,961	12,269,631	10,297,400	4,516,266	2,450,672	124.9	59.1	19.2	128.0	84.3
Salaries	12,626,877	5,406,113	2,857,263	2,215,597	(*)	(*)	133.6	89.2	29.0	...	...
Wages	31,278,755	14,119,848	9,412,368	8,081,803	(*)	(*)	121.5	50.0	16.5	...	...
Paid for contract work	368,511	25,099	69,541	56,765	(*)	(*)	1,368.2	—63.9	22.5	...	...
Rent and taxes (including internal revenue)	1,715,686	505,904	‡415,089	‡403,009	(*)	(*)	239.1	...	...	...	...
Cost of materials	126,111,673	82,191,821	38,912,226	33,482,314	11,113,528	9,641,167	53.4	111.2	16.2	201.3	15.3
Value of products	223,610,784	128,435,747	62,995,909	52,621,830	18,708,917	14,518,924	74.1	103.9	19.7	181.3	28.9
Value added by manufacture (value of products less cost of materials)	97,499,111	46,243,926	24,083,683	19,139,516	7,595,389	4,877,757	110.8	92.0	25.8	152.0	55.7

A minus sign (—) denotes decrease; percentages are omitted where base is less than 100.
† Figures for 1904, 1899, 1889 and 1879 include data for establishments engaged in the manufacture of elastic woven goods, and are not strictly comparable with figures for 1909 and 1914. * Figures not available. ‡ Exclusive of internal revenue.

the industry as a whole, increases in the number employed are shown for all classes, except proprietors and firm members and wage earners under 16 years of age.

A decrease is shown in the number of wage earners in the belting and hose industry, while an increase is shown by each of the other branches reported. Group 3 (rubber goods not elsewhere specified) shows an increase of 89.4 per cent in the number of wage earners in 1914, as compared with 1909.

Wage Earners

May was the month of maximum employment in 1914, 82,193 being reported for August. In both 1909 and 1914 the largest number of wage earners was reported for December, and the smallest reported for January in 1909 and for May in 1904. Table 4 gives interesting statistics regarding the number of employees and the hours they worked.

Character of Ownership

Statistics concerning the character of ownership, or legal organization, of establishments in the rubber industry for 1909 and 1914 show that, in 1914, 91 per cent of the total product of the industry was reported for establishments operated by incorporated companies, as compared with 98.3 per cent in 1909. The value of products for this form of organization increased $103,847,049, or 53.5 per cent, from 1909 to 1914, while the number of establishments and value of products for the other forms of ownership showed a decrease.

The tendency of the industry to become concentrated in large establishments is indicated in the 1914 census reported, in which it appears that the most important group at each census, as measured by value of products, was that comprising establishments with outputs of over $1,000,000, although the group having products valued at $100,000 to $1,000,000 shows the largest number of establishments. The former group reported 83.3 per cent of the total value of products in 1914 and 80.8 per cent in 1909. Each of the other groups reported increases in the total value of products but their relative importance decreased. See Table 5.

The average value of products per establishment for the industry increased from $739,306 in 1909 to $880,099 in 1914, and the average number of wage earners per establishment from 185 in 1909 to 216 in 1914.

Table 6 shows that of the 342 establishments reported for the rubber industry in 1914, 10 employed no wage earners. These were small establishments in which the work was done by the proprietors and firm members. Some of these employed a few wage earners for a short time; but the number was so small and the period of employment so short that in estimating the average number no wage earners could be shown for these concerns.

TABLE 4

INDUSTRY AND STATE.	Census year.	AVERAGE NUMBER OF WAGE EARNERS. In establishments where the prevailing hours of labor per week were— Total.	48 and under.	Between 48 and 54.	Between 54 and 60.	60.	Over 60.
RUBBER GOODS— ALL BRANCHES.	1914	74,022	3,216	9,959	23,969	31,739	4,750	389
	1909	49,264	163	1,201	15,555	23,457	8,881	7
BELTING AND HOSE, RUBBER.								
United States...	1914	5,115	....	....	1,091	2,822	1,202	...
	1909	5,131	....	....	....	4,439	692	...
New Jersey.....	1914	2,239	....	....	....	1,497	742	...
	1909	1,913	....	....	....	1,333	580	...
BOOTS AND SHOES, RUBBER.								
United States....	1914	18,687	....	338	14,859	3,490	....	...
	1909	17,612	....	....	10,142	4,537	2,933	...
Massachusetts	1914	8,087	....	....	8,087	....	....	...
	1909	6,928	....	....	6,928	....	....	...
RUBBER GOODS, NOT ELSEWHERE SPECIFIED.—								
United States....	1914	50,220	3,216	9,621	8,019	25,427	3,548	389
	1909	26,521	163	1,201	5,413	14,481	5,256	7
California	1914	226	55	137	34	....	....	...
	1909	74	34	....	40	....	....	...
Connecticut	1914	2,485	....	366	184	1,568	367	...
	1909	2,115	....	131	....	1,767	217	...

INDUSTRY AND STATE.	Census year.	AVERAGE NUMBER OF WAGE EARNERS. In establishments where the prevailing hours of labor per week were— Total.	48 and under.	Between 48 and 54.	Between 54 and 60.	60.	Over 60.
RUBBER GOODS, NOT ELSEWHERE SPECIFIED (*Continued*).							
Illinois	1914	563	2	38	7	488	28 ...
	1909	104	12	4	25	61	2 ...
Indiana	1914	1,499	....	597	39	448	415 ...
	1909	787	....	....	....	328	459 ...
Massachusetts	1914	4,743	....	246	143	4,348	6 ...
	1909	3,418	5	6	1,157	2,220	30 ...
Missouri	1914	235	49	19	20	147	....
	1909	....	....	....	....	....	....
New Jersey.....	1914	6,316	10	1,139	41	3,666	1,460 ...
	1909	4,255	....	15	10	2,571	1,659 ...
New York.....	1914	3,633	27	797	1,808	305	686 10
	1909	2,066	101	82	88	939	856 ...
Ohio	1914	21,705	3,057	5,848	99	12,297	64 340
	1909	10,382	....	843	4,080	5,158	301 ...
Pennsylvania	1914	3,172	12	417	2,704	29	....
	1909	1,205	5	39	5	784	372 ...
Rhode Island.....	1914	1,541	....	....	744	756	41 ...
	1909	774	....	34	3	647	90 ...
Wisconsin	1914	1,637	....	17	....	1,245	375 ...
	1909	212	....	38	....	....	169 5

TABLE 5

VALUE OF PRODUCT.	Census year.	No. of establishments.	Aver. number of wage earners.	Value of products.	Value added by manufacture.
All classes.....	1914	342	74,022	$300,993,796	$137,959,083
	1909	267	49,264	197,394,638	74,649,536
Less than $5,000.....	1914	26	32	64,221	35,941
	1909	20	24	53,582	24,688
$5,000 to $20,000.....	1914	52	259	528,766	286,135
	1909	45	204	500,503	239,568
$20,000 to $100,000.....	1914	84	1,485	4,212,430	1,938,851
	1909	65	987	3,340,262	1,421,341
$100,000 to $1,000,000.....	1914	117	13,965	45,569,371	19,250,061
	1909	88	9,672	34,000,274	12,509,325
$1,000,000 and over.....	1914	63	58,281	250,619,008	116,448,095
	1909	49	38,377	159,500,017	60,454,614
Per cent distribution.					
Less than $5,000.....	1914	7.6	*	*	*
	1909	7.5	*	*	*
$5,000 to $20,000.....	1914	15.2	0.3	0.2	0.2
	1909	16.9	0.4	0.3	0.3
$20,000 to $100,000.....	1914	24.6	2.0	1.4	1.4
	1909	24.3	2.0	1.7	1.9
$100,000 to $1,000,000.....	1914	34.2	18.9	15.1	14.0
	1909	33.0	19.6	17.2	16.8
$1,000,000 and over.....	1914	18.4	78.7	83.3	84.4
	1909	18.4	77.9	80.8	81.0

* Less than one-tenth of 1 per cent.

In 1914, a majority of the establishments, 69 per cent, employed not more than 100 wage earners, and total number of establishments, gave employment to 70 per cent to 70.2 per cent of the wage earners. In 1909 the belting and hose branch of the industry; 5 in the boot and shoe branch; and 7 in the "other-rubber-goods"

TABLE 6

Industry and State.	Census Year.	Total. Establishments.	Total. Wage Earners (av. No.).	Establishments Employing: No. Wage Earners. Establishments.	1 to 5 Wage Earners. Establishments.	1 to 5 Wage Earners. Wage Earners.	6 to 20 Wage Earners. Establishments.	6 to 20 Wage Earners. Wage Earners.	21 to 50 Wage Earners. Establishments.	21 to 50 Wage Earners. Wage Earners.	51 to 100 Wage Earners. Establishments.	51 to 100 Wage Earners. Wage Earners.	101 to 250 Wage Earners. Establishments.	101 to 250 Wage Earners. Wage Earners.	251 to 500 Wage Earners. Establishments.	251 to 500 Wage Earners. Wage Earners.	501 to 1,000 Wage Earners. Establishments.	501 to 1,000 Wage Earners. Wage Earners.	Over 1,000 Wage Earners. Establishments.	Over 1,000 Wage Earners. Wage Earners.
Rubber Goods—All Branches	1914	342	74,022	10	58	167	75	868	60	1,978	33	2,501	37	5,944	29	10,602	27	18,881	13	33,081
	1909	267	49,264	5	62	182	53	607	41	1,247	19	1,325	39	6,138	21	7,618	15	10,784	12	21,363
Belting and Hose, Rubber.																				
United States	1914	18	5,115	..	..	...	1	15	2	75	3	193	6	1,117	2	724	3	1,948	1	1,043
	1909	18	5,131	..	1	2	1	12	..	....	3	196	6	962	3	1,093	3	1,818	1	1,048
New Jersey	1914	9	2,239	..	..	...	1	15	1	28	2	140	2	290	1	339	2	1,427	..	.....
	1909	9	1,913	..	..	...	1	12	..	....	3	196	3	516	1	487	1	702	..	.....
Boots and Shoes, Rubber.																				
United States	1914	23	18,687	..	..	...	2	13	1	33	..	....	2	355	7	2,935	6	4,824	5	10,527
	1909	22	17,612	..	..	...	1	7	..	....	..	....	3	453	7	2,810	4	3,110	7	11,232
Massachusetts	1914	9	8,087	..	..	...	2	13	..	....	..	....	..	....	3	1,387	2	1,714	2	4,973
	1909	8	6,928	..	..	...	1	7	..	....	..	....	1	137	2	947	1	601	3	5,236
Rubber Goods, not Elsewhere Specified.																				
United States	1914	301	50,220	10	58	167	72	840	57	1,870	30	2,308	29	4,472	20	6,943	18	12,169	7	21,511
	1909	227	26,521	5	61	180	51	588	41	1,247	16	1,129	30	4,723	11	3,715	8	5,856	4	9,083
California	1914	11	226	..	5	20	2	15	3	101	1	90	..	....	..	.....	..	.....	..	.....
	1909	5	74	..	2	4	1	18	2	52	..	....	..	....	..	.....	..	.....	.	.....
Connecticut	1914	18	2,485	..	2	10	6	69	3	99	2	137	1	146	2	649	2	1,375	..	.....
	1909	13	2,115	..	3	7	1	13	2	58	31	222	2	266	..	.....	1	534	1	1,015
Illinois	1914	17	563	1	5	14	7	65	2	66	1	90	..	....	1	328	..	.....	..	.....
	1909	13	104	..	6	15	6	62	1	27	..	....	..	....	..	.....	..	.....	..	.....
Indiana	1914	9	1,499	..	..	...	..	...	4	123	1	66	1	150	2	563	1	597	..	.....
	1909	11	787	..	4	8	1	13	2	53	..	....	3	416	1	297	..	.....	..	.....
Massachusetts	1914	42	4,743	..	10	26	11	125	8	241	5	360	3	455	4	1,490	..	.....	1	2,046
	1909	29	3,418	..	6	20	5	54	6	222	4	291	4	657	3	1,184	1	990	..	.....
Missouri	1914	6	235	..	..	...	4	66	1	22	..	....	1	147	..	.....	..	.....	..	.....
	1909	...	....	..	..	...	..	...	..	....	..	....	..	....	..	.....	..	.....	..	.....
New Jersey	1914	53	6,316	..	5	22	11	143	13	447	9	677	7	1,114	5	1,863	3	2,050	..	.....
	1909	36	4,255	2	4	19	7	90	4	103	6	347	10	1,606	..	.....	3	2,090	..	.....
New York	1914	45	3,633	5	14	36	9	96	7	222	2	194	3	556	2	641	3	1,888	..	.....
	1909	53	2,066	2	17	44	18	204	9	267	..	....	4	658	3	893	..	.....	..	.....
Ohio	1914	54	21,705	1	8	16	14	162	7	230	6	453	9	1,376	1	340	4	2,774	4	16,354
	1909	37	10,382	..	10	30	7	84	8	223	1	95	5	701	2	646	2	1,634	2	6,969
Pennsylvania	1914	19	3,172	1	4	9	3	42	5	179	..	....	1	128	2	694	3	2,120	..	.....
	1909	13	1,205	..	3	14	2	31	4	131	1	84	1	250	2	695	..	.....	..	.....
Rhode Island	1914	6	1,541	..	..	...	..	...	2	71	2	165	..	....	..	.....	2	1,305	..	.....
	1909	5	774	..	1	3	..	...	2	73	1	90	..	....	..	.....	1	608	..	.....
Wisconsin	1914	5	1,637	..	..	...	2	34	..	....	..	....	1	174	1	375	..	.....	1	1,054
	1909	3	212	..	1	5	...	...	1	38	..	....	1	169	..	.....	..	.....	..	.....

only 7.4 per cent of the wage earners were reported by these establishments.

The establishments employing more than 500 wage earners, although forming only 11.7 per cent of the similar percentages for this group were 10.1 and 65.3 per cent, respectively.

There were 13 establishments that reported over 1,000 wage earners each. One of these was included in branch. Four of these large plants were located in Massachusetts, 4 in Ohio, and one each in Connecticut, Indiana, Michigan, Rhode Island, and Wisconsin.

TABLE 7

Product	Number and amount.
Total value	*$300,993,796
Boots, rubber:	
Pairs	4,024,486
Value	$12,647,934
Shoes, rubber:	
Pairs	57,211,728
Value	$37,858,222
Tires:	
Automobile, pneumatic—	
Casings—	
Number	8,021,371
Value	$105,678,951
Inner tubes—	
Number	7,907,351
Value	$20,101,084
Motorcycle and bicycle (including aeroplane tires)—	
Number	3,728,138
Value	$6,905,853
Solid, all kinds, value	$13,735,681
Belting, value	$7,989,405
Hose, value	$16,853,693
Packing, value	$3,507,651
Clothing, value	$6,799,515
Druggists' and stationers' sundries, value	$7,511,755
All other manufactures of rubber, value	$40,133,250
Scrap and old rubber, sold and on hand, value	$1,250,836
Reclaimed rubber, sold and on hand, value	$11,134,958
All other products, value	$8,885,008

* In addition, products to the value of $752,503 were reported by establishments assigned to other classifications.

Fuel

The principal fuel used by the industry was bituminous coal, of which 1,064,761 short tons were consumed. In addition, 131,038 tons (2,240 lbs.) of anthracite coal, 379,324 thousand cubic feet of gas, 18,843 barrels of oil, and 3,131 tons (2,000 lbs.) of coke were consumed.

Special Statistics as to Products

Table 7 gives in detail, for 1914, the quantities and values of the principal products of the rubber industry of the United States. Data for earlier census are not available.

Belting and Hose

The 7 establishments classified as "belting" reported rubber hose to the value of $3,330,173, and other rubber goods to the value of $3,405,-

960, while the 11 establishments manufacturing hose as their product of chief value reported belting to the value of $1,300,393, and other rubber products to the value of $2,729,118, and those establishments making other rubber goods reported belting to the value of $3,081,464, and hose to the value of $6,712,267.

The establishments in the industry were classified according to the product of chief value, but in the manufacture of the various products there was much overlapping between the branches of the industry. For example, there were 18 establishments that reported the manufacture of belting and hose as a chief product, but 18 additional establishments reported some belting or hose.

Classification

In 1914 there were 36 establishments that manufactured rubber belting and hose, 17 of which were in New Jersey, 5 in Ohio, 4 in Massachusetts, 3 each in California and New York, and 1 each in Connecticut, Delaware, Illinois, and Pennsylvania; 24 establishments made rubber boots and shoes, 9 of which were in Massachusetts, 5 in Connecticut, 4 in Rhode Island, 2 in New Jersey, and 1 each in Indiana, New York, Ohio, and Wisconsin; and 95 establishments made rubber tires, including inner tubes, 27 of which were in Ohio, 19 in New Jersey, 9 in Pennsylvania, 7 in Massachusetts, 6 each in Connecticut and Indiana, 5 in New York, 4 in Wisconsin, 3 in California, 2 each in Illinois, Michigan, and Rhode Island, and 1 each in Kentucky, Maryland, and Washington.

Value of Products

The total value of products for the industry as a whole was $300,993,796 in 1914, of which $109,658,605, or more than one-third, was reported by the State of Ohio. Massachusetts, New Jersey, and Connecticut, in the order named, were the next states in importance.

Rubber boots represented 4.2 per cent of the total value of products, and rubber shoes 12.6 per cent. Massachusetts was the leading state in the output of both rubber boots and rubber shoes, producing 1,850,098 pairs of rubber boots, valued at $7,027,168, and 22,760,889 pairs of rubber shoes, valued at $13,486,639. Connecticut and Indiana were the next states in importance in the manufacture of rubber boots, and Connecticut, Rhode Island, and Indiana in the output of rubber shoes.

Tires

Tires are the chief product of the rubber industry, the output of these in 1914 being valued at $146,421,569, or 48.6 per cent of the total value of products for the entire industry. Ohio was the leading state in the manufacture of pneumatic automobile tires, reporting 4,747,666 casings, valued at $61,723,117, or 58.4 per cent of the total value for the United States, and 4,102,959 inner tubes, valued at $10,-

TABLE 8

KIND.	VALUE OF THE IMPORTS AND EXPORTS OF THE MANUFACTURES OF RUBBER FOR THE YEARS ENDING JUNE 30						
	1915	1914	1913	1912	1911	1910	1909
Imports, total	$802,122	$1,559,812	$1,294,536	$915,834	$936,408	$1,234,914	$1,463,589
Exports, total	14,767,513	12,441,220	14,324,894	12,822,918	12,452,562	10,175,634	7,432,832
Belting, hose, and packing	1,807,848	2,372,887	2,605,551	2,315,424	2,163,416	1,960,825	1,498,445
Boots and shoes	2,780,325	1,113,495	1,438,283	1,502,890	2,219,430	1,984,739	1,292,673
Tires—							
Automobile	4,963,270	3,505,267	3,943,220	2,657,809	2,085,107	.....	.....
All other	576,602	563,372	611,458	546,833	592,470	.....	.....
Scrap and old rubber	291,421	598,287	880,442	780,188	723,664	578,944	402,807
Reclaimed rubber	822,561	834,440	932,904	875,501	781,650	535,795	414,861
All other manufactures of rubber	3,525,486	3,453,472	3,913,036	4,144,273	3,886,825	5,115,331	3,823,956

TABLE 9.—COMPARATIVE SUMMARY, BY STATES, FOR 1914, 1909 AND 1904

INDUSTRY AND STATE.	Census Year.	No. of Establishments.	Wage Earners (Av. No.).	Primary Horsepower.	Wages.	Cost of Materials.	Value of Products.
					Expressed in thousands.		
					$	$	$
RUBBER GOODS ALL BRANCHES	1914	342	74,022	199,543	44,167	163,035	300,994
	1909	267	49,264	122,436	25,137	122,745	197,395
	*1904	265	43,873	86,808	20,084	80,002	148,015
BELTING AND HOSE, RUBBER.							
United States	1914	18	5,115	22,995	2,902	12,967	23,561
	1909	18	5,131	17,471	2,473	10,976	19,238
	*1904	19	3,698	12,343	1,805	9,090	14,954
New Jersey	1914	9	2,239	10,266	1,260	5,218	10,341
	1909	9	1,913	8,133	985	5,024	8,302
	1904	12	2,192	7,603	1,112	6,141	9,916
All other States	1914	9	2,876	12,735	1,642	7,749	13,220
	1909	9	3,218	9,358	1,488	5,952	10,936
	1904	7	1,506	4,740	693	2,949	5,038
BOOTS AND SHOES, RUBBER.							
United States	1914	23	18,687	24,621	9,986	23,956	53,822
	1909	22	17,612	25,905	8,544	29,577	49,721
	1904	22	18,991	26,084	8,867	32,000	70,065
Massachusetts	1914	9	8,087	8,177	4,468	10,455	23,789
	1909	8	6,928	8,530	3,376	10,640	18,722
	1904	7	7,674	8,987	3,754	13,178	39,035
All other States	1914	14	10,600	16,444	5,518	13,501	30,033
	1909	14	10,084	17,573	5,168	18,937	30,999
	1904	15	11,317	17,097	5,113	18,822	31,030
RUBBER GOODS, NOT ELSEWHERE SPECIFIED.							
United States	1914	301	50,220	151,927	31,279	126,112	223,611
	1909	227	26,521	79,062	14,126	82,192	128,436
	*1904	224	21,184	48,381	9,412	38,912	62,996
California	1914	11	226	1,180	172	479	965
	1909	5	74	209	61	169	323
	1904	4	45	44	30	131	219
Connecticut	1914	18	2,485	9,598	1,413	5,645	10,188
	1909	13	2,115	6,138	1,116	7,126	11,005
	1904	21	3,143	5,797	1,283	5,342	8,868
Illinois	1914	17	563	1,951	342	965	1,980
	1909	13	104	293	53	200	381
	1904	11	1,179	1,473	459	1,671	2,848
Indiana	1914	9	1,499	5,984	839	4,265	6,333
	1909	11	787	5,276	410	2,908	4,313
	1904	6	558	2,325	255	1,367	2,357
Massachusetts	1914	42	4,743	17,515	2,845	14,142	23,011
	1909	29	3,418	10,123	1,769	11,005	15,796
	1904	47	5,003	10,441	2,208	8,829	14,098
New Jersey	1914	53	6,316	22,214	3,681	15,172	25,458
	1909	36	4,255	12,906	2,300	13,032	19,543
	1904	24	1,728	5,609	846	2,959	4,826
New York	1914	45	3,633	11,915	1,887	4,686	10,228
	1909	53	2,066	6,898	1,058	5,659	8,784
	1904	55	2,692	4,399	1,113	5,000	8,266
Ohio	1914	54	21,705	58,672	14,578	58,737	109,659
	1909	37	10,382	25,885	5,660	32,442	53,911
	1904	27	4,815	13,945	2,318	10,226	15,964
Pennsylvania	1914	19	3,172	8,970	1,744	7,299	12,177
	1909	13	1,205	5,300	566	3,242	4,686
	1904	13	751	2,365	366	1,313	2,220
Rhode Island	1914	6	1,541	3,350	821	4,062	6,089
	1909	5	774	1,075	320	2,075	3,143
	1904	9	991	1,215	417	1,639	2,582
All other States	1914	27	4,337	10,578	2,957	10,660	17,583
	1909	12	1,341	4,959	807	4,334	6,551
	1904	7	279	768	117	435	736

* Figures include data for establishments engaged in the manufacture of elastic woven goods, and are not strictly comparable with those for 1909 and 1914.

TABLE 10

| INDUSTRY AND STATE. | Number of establishments | PERSONS ENGAGED IN THE INDUSTRY. | | | | | | EXPENSES. | | | | | |

Technical Course in Rubber Manufacture*

By H. E. Simmons, M.S.

Professor of Chemistry in the Municipal University of Akron

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SECTION XVII

The Theory of Vulcanisation

The term vulcanisation is derived from "Vulcan," the Roman fire god, its connection with regard to rubber being therefore the heat which causes rubber when mixed with sulphur, to assume entirely different physical and chemical properties.

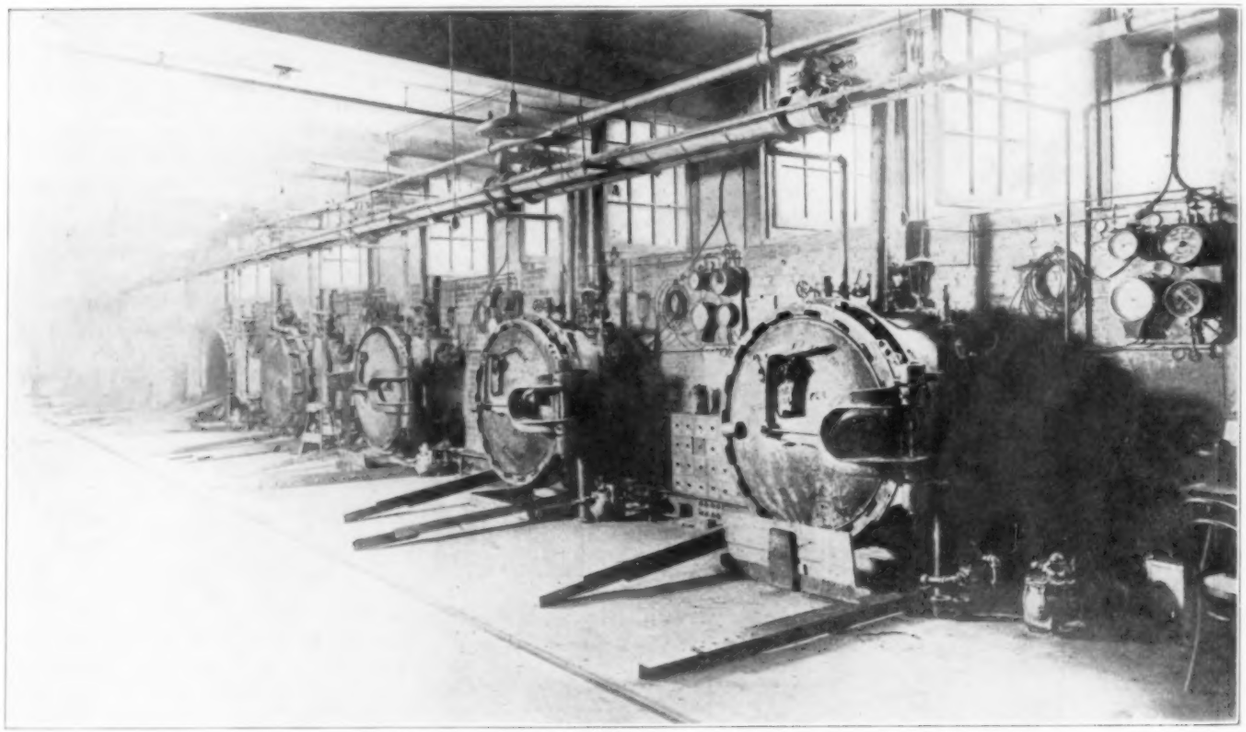
There are two general methods of vulcanisation, namely, what is known as the "cold cure" and the "hot cure vulcanisation." The former is effected by the use of a sulphur monochloride solution, which acts upon the rubber, and as it is a surface action, it may be employed only with very thin articles. This method is also allowed to take place by placing the articles to be vulcanized in the vapors of sulphur monochloride.

The credit for this process belongs to Parkes, who, in 1846, dipped thin strips of caoutchouc, for different lengths of time, in to a solution of 100 parts of carbon disulphide and 2.5 parts of sulphur monochloride. After dipping these strips, he quickly dried them at 78 deg. F. and then washed them in warm water. The process has been modified somewhat since his day but the essential features were known to him.

The credit for the "hot vulcanisation" should be divided between Hancock and Goodyear, who independently discovered that rubber, when heated in contact with sulphur, changes its properties very materially.

They arrived at this conclusion, however, by slightly different means. Hancock in 1843 patented a process for vulcanisation whereby he subjected sheets of rubber to the action of molten sulphur heated to a temperature of 284 deg. to 302 deg. F., when the rubber took up 10 to 15 per cent of sulphur. Of course, these sheets had a great tendency to bloom, so he washed them with a solution of soda. At the same time Hancock was trying these experiments, Goodyear was working along the same lines, only he was mixing the sulphur into the rubber, until he had a homogeneous mixture and then he subjected the product to a high temperature. Of course, the two results were similar, but that of Goodyear, being the easiest to control in many ways, is the method which has survived. Gerard found that it was possible to effect vulcanisation by subjecting the rubber for three hours, under a pressure of four atmospheres in a solution of calcium pentasulphide, to a temperature of 265 deg. F. The articles are then removed and washed with warm water. They are well cured and will possess a velvety appearance. The length of time they must remain in such a bath, of course, is determined by the thickness of the articles to be vulcanized.

Victor Henri in 1909-10, first exposed rubber to the action of ultra-violet rays and found that it underwent a kind of oxidation. Later it was found that, if a solution of rubber containing sulphur was subjected to the ultra-violet rays, the whole mass became thick and of a gelatinous nature, and by test showed combined sulphur. These vulcanized solutions may be used for rubberized cloth,



Battery of Horizontal Vulcanizers in a Large Rubber Factory

* This course commenced in the July 10, 1917, issue of The Rubber Age and Tire News and will be complete in 28 issues.

used as cements, for rubberizing leather, or used in repair work of all kinds.

The French have called this process "Cuisson" and the Germans "burning" but today "vulcanisation" seems to be the accepted term.

Inasmuch as the hot vulcanisation process is dependent upon the temperature to which the rubber is subjected, as will be pointed out later, it is very essential that, during vulcanisation, a close watch is kept of the temperature. A few years ago, although it was known that it was the temperature which effected the change, yet because the heat was derived from steam, which was measured in pounds per square inch, steam pressure was the method of control used in vulcanizing rubber. This led to many very bad results. For instance, in a vulcanizer, you might have the desired pressure of 45 pounds indicated by your pressure gage and yet there might be pocketed air at some place in the heater which is not at the desired temperature and faulty goods would result.

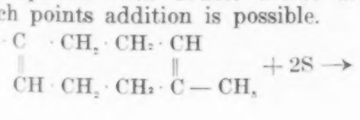
There is no excuse for such trouble today when it is possible to obtain automatic, self-recording thermometers like those put out by the C. J. Tagliabue Co. or those of the Bristol Co.

To study what really takes place during vulcanisation, or in other words, the chemistry of what causes this marked change in the properties of the rubber, was not investigated to any great extent until 1902 to 1910. That is, up to this time, the process had been regarded as purely a chemical phenomenon.

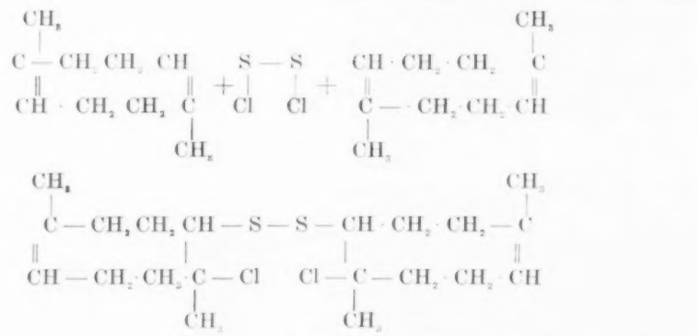
Weber's Theory

The early work of a scientific nature along this line was conducted by Weber and he laid down his theories of vulcanisation which later came in for their amount of criticism. We shall here bring forth the main points which he developed.

Previous to this time, there had existed the impression that when rubber was mixed with sulphur and then heated, substitution took place. Weber showed conclusively that this was incorrect for he pointed out that if this were true, an immense volume of hydrogen sulphide must be produced, which is contrary to our working experience. Thus the substitution theory was abandoned and in its stead, Weber recommended the addition theory. That theory is that if we accept the formula for caoutchouc as recommended by Harries, we have a compound with double bonds at which points addition is possible.



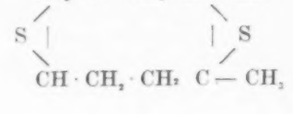
This will stand for rubber completely saturated or hard rubber which has a constant per cent of sulphur of approximately 32. This same reaction takes place in the cold cure, only Hinrichsen has pointed out that the reaction takes place undoubtedly between two such molecules thus:



Weber pointed out that the amount of sulphur which actually entered into vulcanisation was dependent to some extent on many factors, most important of these, however, being the amount of sulphur really present and capable of entering into the reaction, and second the temperature at which the vulcanisation was taking place, and third the length of time it was subjected to this temperature. By varying these conditions, we obtain different degrees of vulcanisation ranging from a soft consisteney up to hard rubber for ebonite.

In order to have some scale for comparing this degree of vulcanisation, Weber suggested the term "coefficient of vulcanisation." That is, in all grades of cured rubber, we have sulphur spoken of in at least three modifications. There is the "total sulphur," the "free sulphur" and the "combined sulphur," the latter being the amount of sulphur which is in combination with caoutchouc. It is the ratio of this sulphur to the total amount of rubber present in the finished product which is called the coefficient of vulcanisation.

The unfortunate thing about the use of this terms is the fact that the same coefficient of vulcanisation with different grades of rubber produces entirely different results, and, in fact, different results in the same rubber if it is handled in different ways. Weber came to the conclusion that this range of vulcanisation from soft rubber to ebonite could be represented by the formation of ten sulphur compounds with caoutchouc,



the lowest having a formula of $(C_{10}H_{16})_{10}\ S_2$ and the highest expressed by the formula $C_{10}H_{16}S_2$. As proof of this he found that when determining the combined sulphur in samples cured for different lengths of time with an excess of sulphur present and then plotting the combined sulphur cure with its per cent on one axis and time expressed on the other, he obtained a broken curve which he took as evidence of a chemical change taking place. These are the points produced by Weber in support of his theory. We shall now give a brief review of the theory of W. Oswald concerning vulcanisation.

Oswald's Theory

W. Oswald was of the opinion that vulcanisation might be explained better upon the grounds of the physico-chemical theory of absorption dealing with colloids than upon Weber's purely chemical theory.

This theory of Oswald's is found in Z. Chem. Ind. Kolloide, 1910, 6, 136-155, as it may be applied to vulcanisation, and he points out the following facts in support of his theory:

First—Regardless of the amount of sulphur added to rubber, whether large or small, there always remains after vulcanisation a certain amount of it in the free state, while the chemical theory would require that if small in amount, it should all be combined.

Second—If vulcanized rubber is extracted with petroleum spirit, sulphur will continue to be removed as long as any remain in the rubber, and this same is true of unvulcanized rubber only the sulphur is extracted more rapidly.

Third—The adsorption of sulphur by rubber is always additive.

Fourth—A continuous series of additive products is formed and yet the amount of sulphur in the series does not conform to the law of multiple proportions.

Fifth—The amount of adsorbed sulphur will depend upon the previous mechanical working of the rubber. The more the mechanical working, the greater the amount of sur-

face produced and thus the greater the adsorptive power of the rubber.

Sixth—The adsorption increases with rise of temperature and conforms more nearly to what should be expected from a physico-chemical adsorption than from a chemical change alone.

Seventh—The adsorption of sulphur is not regular as the sulphur curve shows changes in direction.

Eighth—The adsorbtion of sulphur proceeds more nearly to the adsorbtion formula than to any chemical one. That is,

$$\frac{x}{a} = kc^m$$

Where x = amt. of adsorbed substance,
a = amt. of adsorbent.
c = initial concentration of substance which is adsorbed.
k and m are constants.

From these facts, Oswald concludes that vulcanisation is to be considered as an adsorption of the sulphur by the rubber. Hinrichsen and E. Kindscher studied the reaction which takes place during cold vulcanisation (Z. Chem. Ind. Kolloids, 1910, 4). They prepared a solution of rubber in benzine, using a known quantity of rubber. Then to this they added a known quantity of sulphur monochloride dissolved in benzine and allowed the two to react for three weeks. At the end of this time, they determined the amount of unchanged sulphur monochloride and by difference therefore they knew the amount which had reacted with the known amount of rubber. They came to the conclusion that for a certain amount of rubber, the amount of adsorbed monochloride is constant and is independent of the amount taken. They then calculated a formula for this final compound which they wrote as indicated above $(C_{10}H_{16})_2 S_2 Cl_2$. This work seems to favor, therefore, the idea of a chemical change during vulcanisation but Oswald pointed out that this simply represented the maximum amount of adsorbed sulphur and represented that part of the sulphur curve which was parallel to the axis.

These same men later carried out the following test with the hot vulcanisation. They prepared a solution of rubber in cumene of such a concentration that each 100 c.c. of the solution contained two grams of rubber. To several such amounts they added 1, 2, 3, 4, 5, 6, 7 and 8 grams of sulphur respectively. The mixtures were then all subjected to a temperature of 170 deg. C., while being agitated by carbon dioxide. In each case, the product which resulted did not contain more than 32 per cent of sulphur and therefore agreed with Weber's formula of $C_{10}H_{16} S_2$ showing that here perhaps is a chemical compound capable, therefore, of being represented by a formula.

Following the appearance of Oswald's theory we find a great deal of investigation and discussion along this line. Weber has his followers and Oswald has his cohorts.

Spence's Experiments

Spence and his workers in this country did a great deal of work on this theory of vulcanisation. For instance, they studied the velocity with which free sulphur is extracted from vulcanized rubber by use of hot acetone and came to the conclusion that the last portions of free sulphur are removed very slowly but that a point is reached where no more sulphur may be removed. Therefore, in contradiction to Oswald's theory, they claimed that a definite amount of sulphur had really entered into chemical union with the rubber during vulcanisation. They do, however, agree with Oswald in that they believe that the free sulphur may be adsorbed.

Reversability of Vulcanization Process

P. Bary and L. Weydert (Comptes Rend., 1911, 153, 676-679) did a piece of work to prove that the process which takes place during vulcanisation was one which might be reversed. They extracted some vulcanized rubber with hot acetone until all free sulphur was removed and then heated the extracted rubber for eight hours at 145 deg. C. in carbon dioxide. Following this they extracted again with hot acetone and repeated the previous treatment twice more with the result that the final amount of combined sulphur was less than in the original sample. Therefore, they felt that they had reversed the process of vulcanisation to a certain extent. This is a very important point in the controversy for if vulcanisation may be reversed, it lends great weight to the adsorption theory, while, on the other hand, if it is impossible to reverse the process, then it argues in Weber's favor. They were also of the opinion that during vulcanisation, the rubber itself was depolymerized.

Migration of Sulphur in Rubber

H. Skellon has carried out some experiments dealing with the migration of sulphur in rubber during vulcanisation. He superimposed two sheets of rubber containing different percentages of sulphur and then subjected them to vulcanisation conditions and came to the following conclusions:

That migration takes place either upward or downward with equal facility.

That equilibrium is very quickly arrived at in the two sheets during vulcanisation, and then the concentration of the free sulphur in the rubber is the same in the two sheets.

That the evidence points to the fact that vulcanisation is most probably

(1) Melting of the sulphur;

(2) Solution of the sulphur in rubber;

(3) Slow combination of the sulphur with the rubber.

Skellon made a study of the effect of the polyprene sulphide during vulcanisation and came to the following conclusions:

Let us picture vulcanisation to be represented by the following reaction

$$(C_{10}H_{16})_n + NS_2 <-> NC_{10}H_{16}S_2$$

If this is true, we should expect that during vulcanisation, the ratio of rubber to sulphur remains the same and therefore the reaction should proceed at the same rate of speed, but by actual experiment, this is found not to be the case. The speed of vulcanisation is decreased as the process goes on. This is explained by Skellon to be due to the fact that sulphur is more soluble in polyprene sulphide than in rubber and therefore the law of partition comes in and we actually have some of the sulphur extracted from the rubber by the sulphide which is formed, hence more sulphur will be dissolved by it and the last stages of the cure will proceed very slowly as a result of this.

Researches by Loewen

H. Loewen has carried out a very interesting experiment favoring the idea that the process of vulcanisation consists in the sulphur's first dissolving in the rubber and then combining chemically with it, in contrast to the adsorption theory of Oswald.

To study this phenomenon, he placed a small amount of rubber with 10 per cent of its weight of sulphur on a microscope slide and placed over it a cover glass. This slide he then subjected to a temperature of 130 deg to 140 deg. C., and at regular intervals made microscopic examinations of it.

At first the sulphur melted and the globules could be seen through the rubber itself, later the globules distributed themselves throughout the whole mass and by continued heating, the whole mass became clear or transparent, but he observed further that as this cooled, it became cloudy due to the separating out of the globules of rubber which, as we know, change back in cooling to the rhombic form. Then, again, if the slide is heated until upon cooling it still remains

clear, then when the excess sulphur does separate it will do so in the crystalline form and not appear as globules first thus resembling solutions. He also found that sulphur is more soluble the higher the degree of vulcanisation and calls attention to the fact that hard rubber does not tend to bloom even though it may have a large per cent of free sulphur. This is explained, therefore, on the ground that the sulphur, being more soluble, here remains in solution. He then placed some rubber alone on a slide and placed over it the cover glass and around the edges of the rubber he placed molten sulphur. After regular intervals of heating, he would examine it with the microscope and found that the sulphur diffused into the rubber to some distance as would be expected during solutlion of one in the other.

These experiments led Loewen to the firm belief that vulcanisation was truely a chemical process. (Gummi-Zeit. 1913, 27, 1301-1302.)

Vulcanisation and Viscosity

Dr. Gustave Bernstein in a report before the Rubber Congress, held in London, 1914, showed how he had studied vulcanisation from the standpoint of viscosity. He is of the opinion that rubber must be depolymerized before it can enter into chemical change, that is, it must change physically from $(C_{10}H_{16})_n$ to $NC_{10}H_{16}$. All of the agents which will depolymerize rubber will also reduce its viscosity. He also observed that the viscosity of all completely depolymerized rubber was the same. He also called attention to the fact that all the physical agents that bring about depolymerization, cause a vulcanisation action to take place when the rubber is mixed with sulphur. An example of this is seen when a solution of rubber and sulphur is exposed to the ultra-violet rays. Its viscosity immediately increases. If this is true, then our vulcanisation is to be explained upon the ground that the heat first depolymerizes the rubber and then the sulphur redepolymerizes it.

In support of this theory, he points out the fact that while mixing sulphur and rubber on the rolls at a temperature not exceeding 80 deg. C, vulcanisation took place and by analysis, 0.8 per cent of combined sulphur was found, while upon heating the same mixture in an oven at 80 deg. C for the same length of time no combined sulphur was found.

The conclusion to be drawn is that the mechanical work assisted the depolymerization of the rubber and the sulphur then entered into combination. Then if this be true, the sulphur must act partly at least in the capacity of a catalytic agent. That this is true follows from the work of Helbronner where he found that actinic light had really vulcanized the solution of rubber and sulphur and yet the amount of combined sulphur was only 0.6 per cent. This fact is still borne out by the addition of a small amount of sulphur to aid in the polymerization of isoprene to produce synthetic rubber by the Badische Anilin process. The rubber obtained by this process is polymerized more highly than the natural rubber.

He therefore draws the following conclusions: first, that what we call vulcanisation is a repolymerization; second, smaller quantities of sulphur than are ordinarily used are capable of effecting this change; third, the amount of combined sulphur is not necessarily a measure of the degree of vulcanisation as claimed by C. O. Weber.

The following idea has also been brought forward. As we know certain physical agencies have the power of lowering the viscosity of rubber and this points to its depolymerization. However, the action of these physical agencies like ultra-violet rays, upon sulphur in solution is to polymerize it and thus make it into an insoluble colloidal form. Therefore, vulcanisation is first depolymerization of the rubber and at the same time polymerization of the sulphur and then we may think of the depolymerized rubber as adsorbing the colloidal sulphur.

Upon this theory we might explain the deterioration of rubber under the influence of certain physical agencies as due to the continuation of the depolymerization of the rubber and the increased polymerization of the sulphur.

Ostromislensky's Theory

I. I. Ostromislensky has recently advanced what may be looked upon as a combination theory made up of the two others. He suggested that vulcanization consisted first in a small amount of sulphur forming a derivative with the caoutchouc which may be regarded as the vulcanizing substance, second this substance is then adsorbed by the remaining rubber and the whole mass is regarded as vulcanized. Thus it will be seen that it is first a chemical change and then an adsorptive process. It is in this state of reasoning and theorizing that we find ourselves today.

From work carried out in this laboratory, we have come to the belief of Spence that it is a chemical change and that when accurate determinations of the combined sulphur are made on samples taken at short intervals of time, the sulphur curve will become a smooth one without the kinks in it which Weber found, and may thus be looked upon as a true chemical change.

Information Exchange

Compounds for Toy Balloons

Inquiry No. 8.—We are contemplating taking up the manufacture of toy rubber balloons and would like you to put us in touch with parties who can furnish us formulas for compounds for this class of dipped rubber goods.

Answer.—We know many people who have formulas for the compounds in which you are interested, but cannot say whether or not they would be willing to sell them. If any of our readers have formulas of this nature for sale and care to so inform us, we will refer them to you. In the meantime, you may do well to get in touch with Frederick T. Maywald, 134 Front Street, New York, who, we understand, has had considerable experience in manufacturing toy balloons and similar dipped goods.

Wants Dipping Machines

Inquiry No. 9.—We are in the market for machinery for manufacturing dipped rubber goods and would like to be put in touch with concerns in a position to build this type of equipment.

Answer.—Most manufacturers of dipped goods have found it preferable to build their own dipping machines, or to have them made to order by outside machine shops. The Ornamental Iron Works, Akron, Ohio, makes dipping machines for the rubber industry.

Core Opening Device Patents

Inquiry No. 10.—I follow with interest the complete list of patents concerning the rubber industry which you publish in each issue of THE RUBBER AGE AND TIRE NEWS. Will you kindly tell me whether there has ever been issued any patents on machines or devices for opening up tire casing molds when they are brought from the vulcanizing press. If any such patents have been granted, will you kindly inform me as to their numbers.

Answer.—We would advise you to seek this information from a good patent attorney, preferably one specializing in rubber industry patents.

Magnesia Carbonate and Calcined Magnesia Consumption

Inquiry No. 11.—Can you give us a rough estimate of the total consumption of carbonate of magnesia and calcined magnesia by the American rubber industry?

Answer.—We know of no reliable statistics on this subject, but from information we have obtained from good authorities in the trade, the total consumption of these compounding materials by the American rubber factories is probably in the neighborhood of 750 tons a year.

Safety Stops at Republic Factory

J. A. Latimer, assistant mechanical engineer, and C. E. Alexander, foreman of the electrical division of the Republic Rubber Co., Youngstown, Ohio, have worked out a very ingenious safety stop system that has proved successful on the mill lines of the large Republic plant.

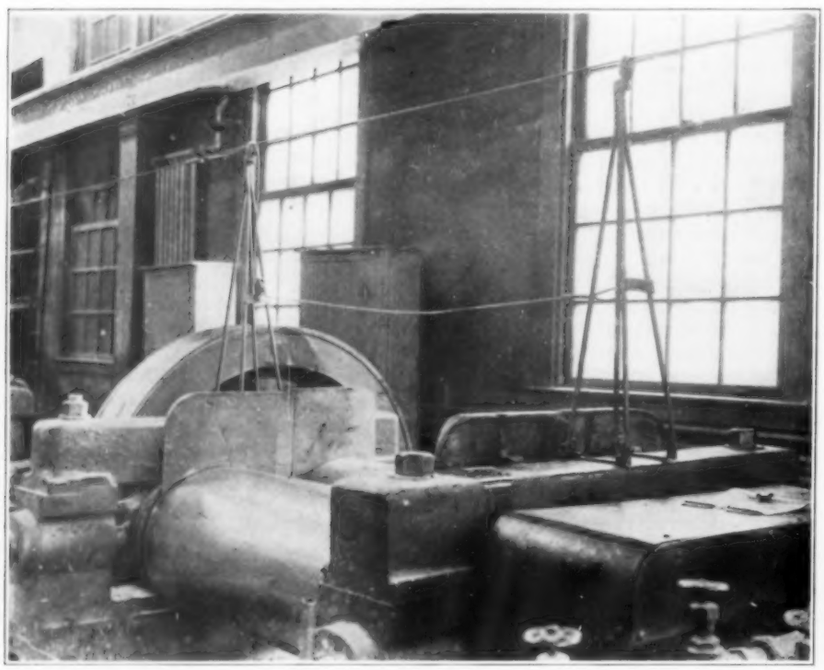
As the accompanying photographs clearly show, the system consists of a steel cable, running along the entire length of the mill line and directly over it.

Connected with each mill, is an operating cable so attached to the main cable as to cause it to operate the " cut-out " switch when the mill cable is pulled or in any way deflected from its normal position.

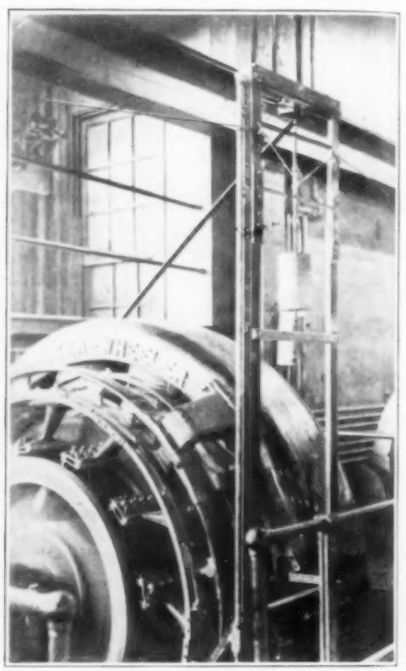
In case of emergency, the operating cable is pulled from any position, either from the front or the rear of the mill; this " trips " the safety stop and causes the mill to stop immediately.

The mill lines at the Republic plant are driven by 400 hp. Crocker-Wheeler motors. These motors are provided with Cutler Hammer controls with safety starters and dynamic brakes.

Besides the safety stops, each mill is provided with an emergency push-button control for shutting down the line without the use of the cable stop system.



Republic Safety Stop Arrangement Showing Operating Cable



Cut-Out For Stopping Mill Line

Field for Rubber Manufacture in China

Acting Commercial Attaché A. W. Ferrin, reporting from Pekin, says, " that the manufacture of rubber tires and other articles will be begun in China very shortly. Several British and American tire manufacturers already have representatives in Shanghai and maintain small vulcanizing plants where the repairing of motor-car tires is done efficiently; and there seems no reason why, with the vast raw rubber supplies of the islands on the southeast coast of China and the inexhaustible cheap labor supply of China to draw on, the manufacture of tires and other things made of rubber should not be very profitable.

" While the condition of Chinese roads does not promise any immediate great expansion of the automobile market outside the principal cities, the vast number of jinrikishas (the popular vehicle for the local transportation of passengers) will provide at the outset a good market for pneumatic tires. Practically all 'rikishas are now equipped with pneumatics. Peking is said to have more than 15,000 'rikishas in operation and the number in Shanghai is hardly less. Hankow has 2000.

" Shanghai is now well supplied with motor cars, for the roads in the municipal settlement and for a considerable distance outside, are admirable; and Tientsin and Peking are taking a lot of cars, the number of which will be greatly increased when the new model highway between Peking and Tientsin is finished.

" But a bigger market for rubber manufacturers lies in the demand for footwear. Chinese shoes are made of cloth or silk, frequently with felt soles, a very comfortable foot covering in fair weather, but not when the streets and roads are deep with mud, as most of them are in the rainy season and not infrequently in other seasons. About $500,000 worth of rubber goods are now imported into China annually, and a factory which could supply a fair quality of rubber shoes at a reasonable price would be assured of a steady patronage."

Prior to the war China obtained most of its rubber footwear from Russia; now America and Japan are sharing this trade.

Increase in Burma's Rubber Production

Recently published statistics show that the rubber production of the seven leading estates of Burma during the first half of 1917 was 635,978 pounds, as against 429,463 pounds for the corresponding period, and 445,150 pounds for the latter half of 1916.

These estates turn out practically all the plantation rubber of Burma. The exportation of rubber from Burma (according to the figures of the chief collector of customs) was 1,165,354 pounds for the whole of 1916 and 711,900 pounds for the first five months of 1917.

A. D. MOFFAT, PRESIDENT
A. I. SEAMAN, TREASURER
ROBERT BROWN, SECRETARY

THE RUBBER AGE AND TIRE NEWS

H. M. WILLIAMS, EDITOR
W. M. MILNER, ASSOCIATE EDITOR
GEORGE NEWBOLD, BUSINESS MANAGER
H. B. SEYMOUR, ADVERTISING MANAGER

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AGITATION for legislation to produce greater revenue is manifesting itself in Washington and the representatives of special interests, in and out of Congress, are stimulating it by their insistence that the tariff should be overhauled when the next revenue bill is brought forward. In the vernacular, "overhauled" means raised from ten to twenty per cent.

The trouble will probably begin in May or June, when it is understood the new revenue bill will be framed and started on its way through the House and Senate.

Within the next three months the Treasury Department will have an accurate line on the probable expenditures for the fiscal year ending June 30, 1918, and will also be in a position to determine how much of the necessary disbursements for this fiscal year and for the one beginning July 1 can be raised by bond issues. By the middle of May the third Liberty Loan will be well under way and the Secretary of the Treasury will be able to give leaders in Congress a definite impression of the capacity of the country to absorb these securities, a consideration that will have an important bearing on the taxation program.

Though the United States is raising a higher percentage of its current expenditures by taxation than any of the other Allies, Mr. McAdoo believes the country sufficiently prosperous to stand further taxation aggregating a billion dollars or more, and that it will be far less difficult to obtain this sum through additional revenue legislation than to increase by that amount the bond issues for the present and succeeding years. It must be remembered in this connection that the abnormally large expenditures due to the war will not cease the moment peace is made, nor for several years thereafter.

The Ways and Means Committee of the House has not yet worked out a detailed program for the framing of a new revenue law, but some of its most influential members have already given informal consideration to four projects:

1.—A moderate increase in corporation and individual income taxes, amounting in the case of individual taxes to the raising of surtax rates.

2.—A substantial increase in the excess profits taxes so graduated as to obtain the bulk of the money from individuals and corporations who are enjoying a high degree of prosperity as a direct result of the war.

3.—The imposition of consumption taxes on such universally used commodities as sugar, tea, coffee, cocoa, and other necessities.

4.—Increased custom duties, *including the bodily transfer of the entire free list to the dutiable schedules.*

Those members of the Ways and Means Committee who favor tariff revision and who also advocate paying as large a proportion of the cost of the war as possible from taxation, suggest that at least $1,000,000,000 may be raised by income and excess profit taxes, $350,000,000 from consumption taxes, and $250,000,000 or $300,000,000 from increased tariff rates, making a total of approximately $1,650,000,000. This latter estimate would indicate an intention to push taxation to the limit, and well-informed men believe it probable that the revenue capacity of the new project would be increased another hundred million or so by raising other rates of tax provided by the war revenue act and by adding some new miscellaneous taxes.

The plan to abolish the free list in the customs tariff, in fact any tampering with the tariff at this time would be considered detrimental to the rubber industry and to business in general. There are special reasons why it is an inopportune time to attempt a general readjustment.

An import tax on crude rubber would probably curtail imports of this commodity, which would be highly undesirable in view of the present uncertain condition of shipping. It would add to the cost of rubber goods, which is already at too high a level, due to the cost of most raw materials, coal, and labor.

Production of rubber goods is already being cut down as a result of their high cost, and should this be increased production probably would be further curtailed.

The rubber industry has shown patriotic interest and unselfishness in its desire to do its part for the nation. It has no desire to avoid paying its full share of the war's cost, but it undoubtedly would be unanimous in opposing taxation of crude rubber.

Rubber manufacturers would undoubtedly prefer to see a tax levied on manufactured rubber articles sold by them, provided that in cases where there are contracts for future delivery of such manufactured articles at the time the tax law should become effective they be legally allowed to add the amount of the tax to the contract price.

There is no doubt but that as soon as the war is over it will be necessary to revise the tariff, and possibly also the administrative laws of the customs, to meet new conditions that will prevail. This being the case, it would seem a mistake to begin overhauling the tariff rates now.

News of Interest to the Rubber Trade

Exports of Manufactured Rubber Goods—U. S. Rubber Sales Show Big Increase—Rubber Association Opens Washington Office—Converse Stock Issue—New York Exhibit of Netherlands Indies Produce

Exports of Manufactured Rubber Goods

On Feb. 6, 1918, the War Trade Board placed all commodities containing rubber on the conservation list. In accordance with its usual practice in cases of a similar character, and to provide a ready method for licensing shipments in transit, the Board has ruled that certain shipments of commodities containing rubber may be formally licensed by the branch offices of the War Trade Board when such shipments are destined to those countries mentioned in the second half of the proclamation of Aug. 27, 1917. To all other destinations these goods have needed a license for some months. The shipments which may be licensed in accordance with this ruling are those which are covered by:

(1) Ocean bill of lading dated Feb. 13, 1918 or earlier; or

(2) Dock receipt dated Feb. 13, 1918 or earlier; or

(3) Through export bill of lading dated Feb. 13, 1918 or earlier; or

(4) Bill of lading marked "for export" dated Feb. 13, 1918 or earlier.

To obtain a license, shippers of goods covered by the above shall present their export declarations in quadruplicate at the nearest branch office of the War Trade Board, using shippers' export declaration Customs Catalog No. 7525, as described in Journal No. 4 of the War Trade Board. No formal application need be made on shipments of this character. The branch office will license the shipment on the declaration but the declaration when licensed will be of use only if the goods are actually exported by March 15, 1918. All shipments not specifically covered by the foregoing will require a regular export license, which must be formally applied for on the customary application form.

It should be noted that this ruling does not apply to shipments of crude or scrap rubber which have required formal export licenses since Nov. 28, 1917.

Applications for license to export, if applied for by a corporation, must be signed by an officer of the corporation or a duly authorized agent of the corporation; if made by a partnership, must be signed by a member of the firm or its duly authorized agent; if made by an individual, must be signed by the individual or his duly authorized agent. The authorization given by a corporation, partnership, or individual to its agent must be by means of a power of attorney. Heretofore the Bureau of Exports has accepted applications signed by shipping clerks and other employees of corporations, but, in view of the fact that this has led to certain abuses on the part of persons who have applied for licenses, this power of attorney will, on and after March 1, 1918, be required before these applications will be considered. It is suggested, therefore, that all exporters who are in the habit of having licenses applied for by a shipping clerk, forwarding agent, or anyone else, file immediately with the Bureau of Exports a power of attorney. These powers of attorney must be acknowledged before a notary public and must bear the necessary 25-cent revenue stamp. The information contained in these powers will be sent by the Bureau of Exports to all the branch offices. The form of power of attorney to be used for shipping licenses was published in the Journal of the War Trade Board No. 2 of Dec. 10, 1917.

It should be specifically noted that such power of attorney will be required not only to enable an employee of the shipper to execute an application for export license; but it will also be necessary to enable any person, firm, or corporation, not the owner of the goods sought to be exported, but acting as forwarding agent or broker, to apply for an export license on behalf of any other person, firm, or corporation.

Big Increase in U. S. Rubber Sales

The annual statement of the United States Rubber Co. for the year ended Dec. 31, 1917, shows net sales of the company for the year were $176,159,000, an increase of more than $40,000,000 over the preceding year. In a recent statement, Samuel P. Colt, president of the company, said:

"With the funding of the company's indebtedness, accomplished early in 1917, the United States Rubber Co. has taken over the plants of most of the subsidiaries, including those of the Rubber Goods Manufacturing Co., all of the minority stock of that company having been acquired. This has made practicable the consolidation of the mechanical goods division of the company which recently has been accomplished, and from which are anticipated very beneficial results.

"In connection with the funding of the indebtedness in the early part of the year into $60,000,000 five per cent thirty year of first and refunding mortgage bonds, the directors have felt it proper to charge off against the company's surplus the entire discount on such bonds and the amount of the expenses of such funding, amounting in all to $5,362,612. They also have made liberal charges to provide for doubtful assets, these latter charges amounting to $1,583,829. In our export business there has been greater activity the last year and such sales have increased more than fifty per cent. In 1917 the proportion of export sales to the entire business of the company has been seven per cent, as compared with six and one-half per cent in 1916.

"With our country at war we have received larger war orders than in any previous year, and yet these represent only about five per cent of our total business. There is every indication of our company doing in the present year a business even larger than in the past, and, while the uncertainties of trade are greater than in normal times, we look for satisfactory results."

The statement shows net profits for the year 1917, less interest charges of $3,117,856, amounted to $21,306,106. Reduction and depreciation totalled $2,500,000; estimated federal income and excess profits taxes and business profits tax on Canadian properties were $3,465,529. Dividends on preferred and dividends paid to minority stockholders of subsidiary companies were $4,982,062, leaving as the surplus for the year $10,358,514.13.

Netherlands Indies Exhibit in New York

The opening at 11 South William Street, New York, of the Netherland Indian Government Intelligence Office and Produce Sample Room, is announced by the Consulate General of the Netherlands in this city.

In his announcement the Netherlands Consul-General states that although in recent years the Netherland East Indian Archipelago has been attracting steadily growing attention all over the world for the richness of its natural resources, there remains still a wide scope for extending its commercial relations with various countries, especially with the United States.

The Netherlands Colonial Government is anxious to promote such extension as much as possible and considers that propagation of a fuller and better knowledge of the articles produced in those islands may serve a useful purpose in this respect.

Samples of crude rubber and other important export articles of the Netherlands East Indies will be on exhibition and J. H. Muurling, who is in charge, supplies full information free of charge to anyone interested.

The Bureau will abstain rigorously from all commercial dealings and from all interest in such dealings, directly or indirectly.

Rubber Association Opens Washington Office

The Rubber Association of America, 17 Battery Place, New York, has opened a branch office in Room 905 Colorado Building, Washington, D. C., to keep in close contact with government matters. The Washington office of the Association will also be used by the War Service Committee of the Rubber Industry of the U. S. A.

Converse Stock Issue

The Converse Rubber Shoe Co., Malden, Mass., is selling the last of a $550,000 issue of seven per cent cumulative preferred stock. Up to the present time approximately $500,000 has been sold. The following is the financial statement of the company:

ASSETS.		
Cash	$58,212.50	
Merchandise	698,767.30	
Accounts receivable	906,747.29	
Raw material	224,989.70	
		$1,888,716.79
Plant & equipment	877,940.85	
Leases, trade-marks & copyrights	255,000.00	
Cash value insurance	12,874.51	
Cash value prepaid interest	700.95	
Stationery & supplies	2,997.50	
Automobile trucks	6,106.94	
Investments	20,928.18	
Prepaid expense	28,024.80	
Converse Rubber Shoe Co.:		
Preferred stock	7,300.00	
General capital stock	15,000.00	$1,227,773.82
		$3,116,490.61
LIABILITIES.		
Preferred stock	$1,265,100.00	
General capital stock	375,300.00	
Notes payable	937,531.44	
Accounts payable	67,656.15	
New York Reserve expense	52,136.08	
Chicago Reserve expense	23,217.22	
App'n & Dep'n acct.	37,151.37	
Dividend reserve	8,730.65	
Surplus	349,967.70	
		$3,116,490.61

Trademark Registration Bureau at Havana

Announcement is made by Washington of the inauguration by the Cuban Government of the International Trademark Registration Bureau of Havana for the Northern group of American Republics of which Dr. Mario Diaz Irizar has been appointed director.

Van Cleef Exhibit

Van Cleef Bros., Chicago, Ill., manufacturers of rubber cement, had a little Dutch girl distributing advertising literature at their exhibit at the Chicago show. The reason for the Dutch girl was that their products are branded "Dutch."

Rubber Companies Expanding

Many Companies Erecting New Plants—Others Making Additions and Installing New Machinery and Equipment

Armstrong Plans New Factory

The Armstrong Rubber Co., Newark, N. J., announces that the Osborn Co., Cleveland, Ohio, are preparing plans and specifications for a new Armstrong factory, which will be equipped with the most up-to-date machinery for manufacturing 500 casings and 1000 inner tubes per day. This new plant will be located in Garfield, N. J.

New Office for Naugatuck Rubber Factories

Rapid progress is being made in building a large addition to the office of the Goodyear's India Rubber Glove Manufacturing Co., Naugatuck, Conn., which is to serve as a central office for the Goodyear's Metallic Rubber Shoe Co. and the Goodyear's India Rubber Glove Manufacturing Co. when completed. The addition will approximately double the present office capacity and, together with alterations on the present office, will make an extremely attractive, up-to-date building.

Sidney Rubber to Build

The Sidney Rubber Co., Vancouver, B. C., will erect a manufacturing plant near that city at an initial investment of $125,000.

Sioux City Tire to Improve Facilities

The Sioux City Tire Co., Cleveland, Ohio, has increased its capital stock from $220,000 to $1,000,000 and plans to enlarge its manufacturing facilities by building an addition to its plant.

Doss Places Machinery Order

The Doss Rubber Co., Atlanta, Ga., has placed orders for about $70,000 worth of additional machinery and expects to complete its factory by May or June.

Devine to Make New Addition

The J. P. Devine Co., Buffalo, N. Y., builders of vacuum drying and impregnating equipments, plans to build a new one-story brick and steel addition to the copper shop of its plant at an estimated cost of $6,000.

Bakelite Plans New Buildings

The General Bakelite Co., Perth Amboy, N. J., manufacturer of insulation specialties, has secured a site near its present works and plans to build several additions.

New Factory in Ontario

The Boston Insulated Wire & Cable Co., Limited, recently incorporated with $200,000 capital stock in Hamilton, Ontario, plans to build a plant for manufacturing insulated wire and cable and similar goods in that city. B. T. Burley, Worcester, Mass., and G. W. Arnolds, Hamilton, Ontario, are among the incorporators.

Essex to Build Addition

The Essex Rubber Co., Trenton, N. J., manufacturers of composition soles, rubber heels, automobile accessories, inner tubes, cements and molded rubber specialties, are planning the construction of a $30,000 addition to its plant.

Luzerne to Enlarge Plant

The Luzerne Rubber Co., Trenton, N. J., manufacturers of battery jars and other hard rubber specialties, plans to spend $20,000 in enlarging its plant.

Parker to Build Plant

The Parker Tire & Rubber Co., Indianapolis, Ind., recently incorporated, plans to build a plant for manufacturing high-grade tires. P. P. Parker is president of the company.

Rubber Factory for Vancouver

The Sidney Rubber Co., Vancouver, B. C., plans to build a $125,000 plant near that city.

Spotswood to Move to Trenton

The Spotswood Rubber Co., Spotswood, N. J., is planning for the removal of its plant to Trenton, N. J.

Tire Plant for Newark

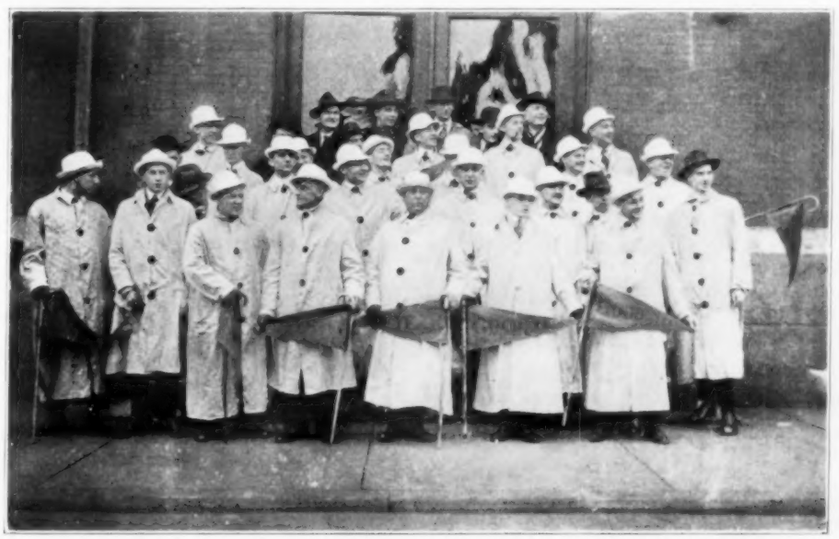
The Hanley Rubber & Tire Co., incorporated with $50,000 capital stock, plans to establish a plant in Newark, N. J., for the manufacture of tire and automobile accessories. D. M. Hanley, 38 New St., Newark, N. J., and M. Hoffman are the incorporators.

Hewitt Enlarging Plant

The Hewitt Rubber Co., Kensington Ave., Buffalo, N. Y., has awarded the contract for a 2 story, 40x12x47 ft., steel vulcanizing plant to cost approximately $5,000.

To Build Factory in Brooklyn

The Ajax Rubber Co., Brenning Ave., Trenton, N. J., has purchased a site on Newtown Creek and East River, in the Greenpoint district of Brooklyn, and plans to erect a rubber factory.



THE GOODYEAR FRIARS

A minstrel organization of the Goodyear Tire & Rubber Co., which recently journeyed from Akron, Ohio, to Camp Sheridan in Montgomery, Ala., to give an entertainment to the soldiers there. The Goodyear organization received a big ovation at the camp which is made up of men from the Ohio National Guard.

New Vulcanizing Plant in Memphis

The Memphis Tire & Vulcanizing Co., Memphis, Tenn., recently organized with R. E. Priddy as president, and $10,000 capital stock, plans to establish a vulcanizing plant in Memphis.

Federal Building New Factory

The Federal Rubber Manufacturing Co., Cudahy, Wis., has awarded the contract for a one-story 60 x 100 ft. factory, to cost $150,000.

New Tire Factory in Iowa

The Standard Four Tire Co., Keokuk, Iowa, has awarded the contract for a 2 story, 25x30 ft. factory, to cost approximately $25,000.

New Rubber Factory in Chicago

The Century Rubber Co., Chicago, Ill., has had plans prepared for a 6 story factory to be erected on West 31st St., in that city. C. J. Venn, 1346 Rawson St., Chicago, Ill., estimates the cost of the new factory at $100,000.

Akron Biltwell Building

It is reported from Akron, Ohio, that the Akron Biltwell Tire & Rubber Co., 304 Ohio Building, Akron, Ohio, is building the first unit of its new plant.

Home Rubber to Enlarge Plant

The Home Rubber Co., Wolverton Avenue, Trenton, N. J., manufacturer of mechanical rubber goods, has increased its capital stock from $500,000 to $1,000,000 and plans to built an addition to its plant.

Thropp's Sons Adding to Plant

The J. E. Thropp's Sons Co., foot of Lewis Street, Trenton, N. J., manufacturer of tire-making molds and rubber-working machinery, plans to build a one-story, 63 x 320 ft., machine shop addition to its plant; also a one-story, 75 x 350 ft., gray iron foundry on Fair Street, Trenton, and to install a 10-ton traveling crane. J. P. Hunt, architect, 114 North Montgomery Street, Trenton, N. J., will be in charge of the work.

Duncan Erecting New Buildings

The J. Duncan Co., 7 Fulton Place, Boston, Mass., designers and manufacturers of overhead trolley systems for the economical handling of tires, cores, molds and every description of rubber goods, have awarded the contract for a one-story, 50 x 110 ft., and a one-story, 40 x 65 ft., factory buildings to be erected in Everett, Mass.

News from the Rubber Metropolis

Annual Swinehart Sales Conference Dinner—Akron's War Offerings—Goodrich Earnings for 1917—Goodyear Pays Big Tax—Coffee Houses Abolished

Men from Rubber Factories Clear Roads

(Special Akron Correspondence)

A serious tie-up of freight traffic between Akron and Cleveland was averted during the recent heavy snows by one hundred Akron laborers.

Armed with picks and shovels laborers, loaned by the Goodrich, Firestone and Goodyear companies, worked heroically for two days and nights in the biting cold, clearing a snow-bound stretch of eighteen miles on the Akron-Cleveland road. The men loaned to the county were transported to and from their work by trucks of the three rubber companies.

John Gauthier of the Goodrich, who supervised the work provided every possible convenience for the workers. One Goodrich truck equipped with a big hot blast stove served as a warming station and also as a diner. Hot coffee and sandwiches could be had at all hours.

Over 100 big trucks are said to carry hundreds of tons of tires and other rubber goods to Cleveland freight terminals daily over this vital highway and return laden with supplies and machinery for Akron's rubber factories. Akron's industry would be seriously crippled by a closed road to Cleveland.

Coffee Houses Abolished

(Special Akron Correspondence.)

Coffee houses, which have become one of the worst menaces to the health and morals of the Rubber City, are to be abolished by the new city administration.

Heretofore it was impossible to get rid of these places because they were not licensed. Now their proprietors will be required to take out licenses and to abide by a strict set of regulations under penalty of having the permit to operate revoked.

Large Tax Paid by Goodyear

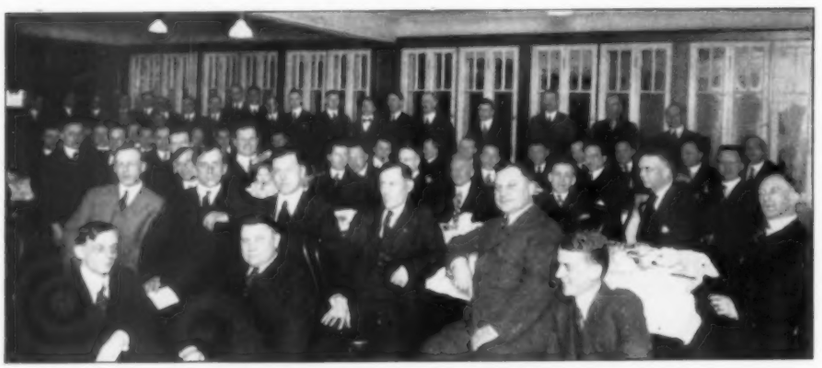
(Special Akron Correspondence.)

The largest tax ever paid by any Akron corporation was collected by the county treasurer when the taxes of the Goodyear Tire & Rubber Co. were received recently. They aggregated $182,00, which is $5,000 in excess of the taxes paid by the B. F. Goodrich Co.

Shelby A. Falor has recently been appointed a member of the board of control of the Goodyear Tire & Rubber Co., receiving well merited recognition of 16 years of service. He formed his connection with the Goodyear as a stengrapher.

About a year ago he was elected president of the Federation of American Motorcyclists, and during that time has brought that organization to a high degree of efficiency in dealing with the rapid growth of the motorcycle business.

Mr. Falor was born in Akron, and lived there all his life. The Falor family was one of the pioneer Akron families.



SWINEHART ANNUAL SALES CONFERENCE DINNER

Annual Swinehart Sales Conference Dinner

The annual sales conference dinner of Swinehart Tire & Rubber Co., Akron, Ohio, was held Feb. 9 at Young's Hotel and was attended by officials, branch managers, salesmen and factory department heads. An orchestra, composed entirely of employes of the company, furnished music for the evening. Some interesting talks were given by officials and salesmen. President T. F. Walsh held the interest of the assembly with his fitting remarks on the relation of the rubber industry to the war and the part it must play.

Akron's War Offerings

(Special Akron Correspondence.)

Here are a few of Akron's offerings to the war: Rubber tires for trucks, pneumatic tires, submarine engines, food supplies, airplane accessories, balloon fabric and equipment, airplane fabric, gas masks, barbed wire, clothing, telephone equipment, hospital and surgical goods, rubber implements for battleships, rubber hose, steam hose and lots of men and plenty of money.

Goodrich Earnings for 1917

(Special Akron Correspondence.)

The B. F. Goodrich Co. had the best year in its history in 1917. The net earnings amounted to $12,675,000, exceeding even the year of 1916. No statement was made on gross business.

This does not include any income and excess profits taxes, which may reach $2,250,000, leaving the net profit $10,245,000 or well ahead of the $9,500,000 earned last year.

Two preferred dividends and one common dividend were declared. The net earnings added to the previous surplus makes a total of $20,000,000 in undivided profits.

F. C. Van Cleaf, attorney, was elected secretary of the company, succeeding Guy B. Norwood, now head of the Republic Rubber Co., and B. Hough was added to the directorate to fill vacancy. It was voted to retire 9,000 more shares of preferred stock, which is being gradually reduced each year out of earnings.

Gammeter's New Balloon Fabric

(Special Akron Correspondence.)

John R. Gammeter of Akron has applied for a new process balloon patent fabric which is a composite of rubberized, interwoven parallel threads of cotton, the whole attached to a thin sheet of pure gum to keep the threads in a band while weaving, when they are passed through a rubber cement.

The inventor claims unusual durability for his fabric and says it is bound to be accepted for the manufacture of war balloons.

It is possible that one of the rubber companies will give the fabric a try-out to see whether it excels the present balloon fabric.

Firestone Police Force Increased

(Special Akron Correspondence.)

In September, 1916, there were sixteen members of the police department of the Firestone Tire & Rubber Co. Today there are ninety members, uniformed and equipped like a city force, with an experienced chief and subordinate officers.

Sergeant Wilmington in France

(Special Akron Correspondence.)

The first man to enlist from the Firestone Tire & Rubber Co. was Vance B. Wilmington, an employee of Firestone Park, the company allotment. He is now in the first regiment of engineers with the American Expeditionary Forces in France.

Foley Joins Swinehart Forces

(Special Akron Correspondence.)

E. E. Foley, formerly in the automobile business in Winnipeg, Canada, has joined the selling forces of the Swinehart Tire & Rubber Co. as special representative.

Lanning Organizing Club at Swinehart

(Special Akron Correspondence.)

Mr. Lanning, chief statistician of the Swinehart Tire & Rubber Co., is organizing a club for the promotion of friendship and fun among the employes. Clubs for the promotion of social activities are especially in demand at the present time and Mr. Lanning is sure to succeed from reports of the enthusiasm with which the plan is being received.

Goodrich Curtails Passes

(Special Akron Correspondence.)

The issuing of passes to friends and relatives of employes of the B. F. Goodrich Co. have been curtailed, on account of the great pressure of work and unusual conditions prevailing.

Kluger Is Youngest Captain

Capt. R. R. Kluger, former Akron rubber man, has the distinction of being the youngest captain at Camp Sherman.

Captain Kluger was twenty-one when commissioned, and although 80 per cent of his men are his senior in years, they all swear by their youthful captain.

Election of the Yellow Dogs

(Special Akron Correspondence)

The Goodrich Order of Yellow Dogs, at a meeting recently, elected the following officers for 1918:

Chief houn, Wm. Fox; vice-chief houn, R. Duchene; recording houn, K. T. Wright; financial houn, E. H. Hill; watch dog of treasury, J. T. Scott.

TIRE NEWS

Tire Trouble in the Hardware Trade

By F. R. Goodell

Bobby Burns, the Scotch bard, was no business man. But when he wrote, "Oh wad some power the giftie gie us to see oursel's as ithers see us," he touched the heart of a great business fundamental. The other fellow's views, whether sound or not, demand the most scrupulous consideration, particularly when his active operation is desired. This seems particularly true of the attitude the tire manufacturer should assume toward the distributor and consumer of his product.

It has been the writer's good fortune of late to meet and swap ideas with that latest recruit from "old line" business—the hardware merchant. It seems unnecessary to reiterate that he is a logical distributor of tires, but it is timely to point out that while he dosen't as yet know all there is to know about tires, he actually does know business itself, in all its angles and phases. He enters the tire business equipped with a vast capital of brains and business training—the heritage of one hundred years of sound trading.

It cannot be expected that this new distributing factor will consent to remain in the subordinate position of a silent partner in the tire business. Many things that have grown up with the tire business are obsolete, and these invite the criticism of all concerned—certainly no method should be tolerated that is fundamentally wrong simply because of its venerable antiquity. Your hardware merchant is given to speaking right out in meeting, and if he has a bit of constructive criticism to make, he gets it right out of his system wherever two or three are gathered together in the name of better merchandising.

A free exchange of ideas is always beneficial, and if encouraged it will result in mutual profit to all the factors in the tire business. Any industry with such a history of teeming and resistless growth behind it is apt to become just the least bit complacent about itself, and sort of "sot" in its ways.

It is to be expected in an enterprise that has leaped within two decades from a precarious gamble to the

F. R. Goodell

exalted position of America's third largest industry. There simply hasn't been a place for a croaker to hang his hat—every tire man has been too busy pointing-with-pride to worry much about whither-are-we-drifting. After all, most of the rough spots in the tire business can be largely ascribed to acute "growing pains." What form they have taken and how they have operated to its disadvantage are matters well worth solid consideration at this particular period.

Getting back to Bobby Burns—the writer had the "giftie" thrust upon him in a thoroughly comprehensive manner while returning from the Coast last summer. The Pullman smoking compartment, that hallowed shrine of the traveling male, contained the usual run of representative American business men, among them being an eminently successful hardware jobber. The talk ran mostly to war—then switched to business conditions, turned to automobiles as a barometer of sustained national prosperity, and that naturally brought up tires—and an argument.

Of course, I am among those who figure tires as the great national without-which-nothing, and said so—added a few trimmings of statistics, and topped off with a sort of general hurrah for the whole industry. There was a slight lull, during which the Hardware notable cleared his decks for action, then opened up with this pulverizing broadside: "Young man, you may know what tires *are*, but I know what they *aren't*. We'll grant that they are staples because they are necessities, but they are far from being first-class merchandise as yet. The standards for judging value are too indefinite, the lines are too long and congested with deadwood, sales methods are neither standardized nor efficient, the business is cluttered up with consignments, quantity price schedules, price wreckers, wasteful and ill-advised advertising campaigns, and finally your guarantee and adjustments are a practical joke on a man's patience.

"If you set out to sell service, you must carry such a stock of odds and ends for out-of-date cars that your turn-over is stultified in consequence. Then, too, your market from jobber to consumer is so thoroughly tainted with unearned preferential discounts as to wholly camouflage *cost* in its relation to *value*. Personally, my conception of business gets right down to so much for so much. Price and discounts mean less than nothing to me by themselves. As a wholesaler, I maintain it's not what a thing costs me that matters, but how much more I can get for it with satisfaction to my customers—and here I am limited by the well-meant presumption of the tire manufacturer himself, in the matter of his various price lists.

"It is not enough for him to set the price at which *I* purchase, but he

must schedule as well the price I sell at, and, further than that, the price at which my customer sells to his customer. It seemingly has not occurred to the manufacturer that his price schedules are observed more in the breach than otherwise—thus putting the merchandise always at a discount. He has effectually eliminated the possibility of it ever being sold at a premium, since no dealer can get more for a tire than is called for by the published list. Outside of all this, the business looks very promising; but personally, I intend passing the buck along until it has shaken down to the level of honest-to-goodness merchandise."

Before I could enter a sweeping denial to this arraignment he had departed for the diner, leaving me flat and the tire business hanging in the air. The discussion was not reopened until the following morning, and by that time a suspicion had seeped in that some parts of the indictment were facts. Facts which could not be reasonably disputed, although they were palliated by the unusual nature of the industry and its unprecedented growth.

With all its imposing might the tire business is essentially a dependent enterprise. It occupies much the same position as does the Kingdom of Bavaria to the German Empire, in its relation to the automobile industry. It must share in all its vicissitudes of fortune, both good and bad, and, above all, it must share directly in the mistakes and errors of the ruling sphere of motordom. In short, the automobile manufacturer is distinctly the dog, and the tire business is the tail. It is admittedly a very large tail—a tail of which any dog would be proud, and in this instance quite indispensable to its owner. But it is essentially the tail for all, and cannot be wholly blamed for its inability to wag the dog.

Take, for instance, the Hardwareman's statement that tire lines are too long—too cluttered with deadwood. Here again the tire maker is but the slave of the lamp—said lamp being in the exclusive possession of the car makers, and the rubbing of it wholly in the hands of their designing departments.

Long lines mean lean profits—this is a commercial axiom. Ford found it out early and made millions by sticking to little old Model T. But other manufacturers went right along, carrying a model for every day in the week, and two for Sundays, each with its own peculiar tire requirements. Constant change in car weights and engine speeds demanded corresponding modifications in tire sizes and types. These necessary (?) modifications resulted in the accumulation of an appalling multiplicity in the stock a dealer must carry in order to render a reasonable service to motorists.

The old-line business man can certainly be excused for his belief that the diversification of tire sizes and types is all out of proportion to the demand that should normally come from the consumer. For instance, it is a staggering fact that since 1913, thirty-one different tire sizes (exclusive of metrics) have appeared as equipment on domestic passenger cars, each of these so diversified among the clincher, Q D Clincher and straight-side types as to make a total of 58 wholly distinct tires. But this isn't all, because you must *double* the sum in order to account for both plain and non-skid treads, thus reaching a colossal aggregate of 116 tires—on two alike.

Just think what this means to the conscientious dealer who sets out in the name of service to carry just one each in stock. At an average wholesale price of $25 each, he would have on his hands an investment of $2900, and even then fall short of having a real tire stock. Variety is indubitably the spice of life, but if this isn't variety gone to seed—what is it? While the above is admittedly an exaggerated instance, still it is distinctly true that the problem of making tire service and turn-over pull together with profit is an exceedingly difficult one.

As an off-set to this somewhat pessimistic layout, it is encouraging to note a wholesome trend toward a shortening of the line, and a tendency toward standardizing tire types and sizes into a small, compact and well-defined group.

28 x 3 Cl.
30 x 3 Cl.
29 x 3½ Cl.
30 x 3½ Cl. and SS
31 x 3½ Cl.
32 x 3½ Cl., Q D C and SS
34 x 3½ Q D C and SS
36 x 3½ Q D C
31 x 4 Cl., Q D C and SS
32 x 4 Q D C and SS
33 x 4 Cl., Q D C and SS
34 x 4 Cl., Q D C and SS
35 x 4 Q D C
36 x 4 Cl., Q D C and SS
37 x 4 Q D C
31 x 4½ Q D C
32 x 4½ Q D C and SS
33 x 4½ Q D C and SS
34 x 4½ Q D C and SS
35 x 4½ Q D C and SS
36 x 4½ Cl., Q D C and SS
37 x 4½ Q D C and SS
38 x 4½ Q D C
33 x 5 Q D C and SS
35 x 5 Q D C and SS
36 x 5 Q D C and SS
37 x 5 Q D C and SS
38 x 5 Q D C
36 x 5½ Q D C
37 x 5½ Q D C
38 x 5½ Q D C

Summary—31 sizes, 58 types, both plain and Non Skid or 116 different tires.

As an evidence of this, let us take the 29 sizes referred to as having appeared since 1913, and see how it has been whittled down to the more or less modest demands of the late models.

Now contrast this list to tire specifications of 1918 models as given below:

28 x 3 Cl
30 x 3 Cl
30 x 3½ Cl and SS
32 x 3½ Cl
31 x 4 Cl and Q D C
32 x 4 Q D C and SS
36 x 3½ SS
33 x 4 SS
34 x 4 SS
32 x 4½ Q D C and SS
33 x 4½ Q D C and SS
34 x 4½ Q D C and SS
35 x 4½ SS
36 x 4½ Q D C
33 x 5 SS
35 x 5 Q D C and SS
36 x 5 Q D C
37 x 5 Q D C
36 x 5½ Q D C

Summary—19 sizes, 25 types, both plain and Non Skid or 52 different tires.

Note the tendency to confine the Clincher type to small sizes; Q D C to large sizes and straight side to medium sizes. Thirteen sizes have been eliminated and the types so selected as to reduce the line to less than half its former length. It goes without saying, of course, that the dealer must still reckon with those cars made prior to the vintage of 1918; but as these pass out of commission he can look forward to an increasing measure of relief in future years.

(The trend of tire types and sizes, and the tendency toward further simplification, will be discussed in a succeeding article.)

E. B. Sigerson on Advertising Waste

E. B. Sigerson of the McGraw Tire & Rubber Co., in discussing the waste resulting from the distribution of advertising matter through the dealers said: "The distribution of advertising matter through the dealer always has been accompanied by a considerable amount of waste, and no better thing can be done right now than to eliminate this waste and to make the distribution of this advertising matter as economical as the distribution of any other kind of merchandise.

"Very often the salesman completes a sale, and when he is writing up his orders at night he decides to send the dealer advertising matter and so he sends in his order, which in due time is sent out to the dealer.

"The dealer is not equipped to distribute this advertising matter properly to his trade, he had not asked for it, it is not welcome, and not having been thoroughly advised as to the purpose of this advertising matter, he rather resents the manufacturer's attempt to force him to advertise for the manufacturer's benefit.

Goodrich Tire Testing Fleet

Seeking suitable routes for motor trucks, testing tires and preaching the gospel of tire economy during the winter months carries with it a multitude of hardships. At least the fleet of The B. F. Goodrich Rubber Co. has found it so. Since leaving Lima, Ohio, the base of operations, on an expedition fraught with many possibilities the fifteen cars of the tire testing fleet have encountered innumerable obstacles. Pilots and rubber experts have had to work more with shovels than with the wheel. Large snowbanks have flung up barriers which no automobile, no matter what speed is tried, can crush without divergence to some other weapon than speed and power. Once drivers were compelled to dig for six miles in order to make ground. This required ten uninterrupted hours of labor.

Despite hardships and difficulties the fleet has succeeded in reaching Nashville, Tenn., the base from which it will operate for three months, with many lessons to impart to the motorist and truck user. The mission of the tire testing fleet might be described as a three-fold one. It will concentrate a good portion of its energies on picking out southern roads that can be used by plantation owners and manufacturers south of the Mason and Dixon line in shipping produce and products to markets without loss of time and money from possible railroad congestion. Pathfinders reported great uneasiness in the south over the transportation problem and unprecedented purchases by plantations and producers of light and medium weight trucks.

Indications point to plans for big crops this year, particularly cotton, tobacco, fruits and vegetables. With cotton selling at the highest price in history, producers have been anxious to "collect," so to speak. However, these same producers found the railroad situation anything but optimistic. Huge army cantonments dot "Dixie" and all lines of communication are crowded with supplies for troops. The producer must wait his turn, which in the south with its rather sparse facilities is a long wait. Hence, the selection of the motor truck as the best and most economical substitute.

Motor trucks, however, require tolerably good roads. Furthermore a strange driver in a strange land loses time, wastes gasoline and his equipment and detracts from his employer's profit if he is constantly getting lost, taking costly detours and plunging his car into a morass, extrication from which requires outside assistance.

The Goodrich Co. is endeavoring to alleviate this danger in several ways. First it is guide-posting as many roads as possible in the south. Secondly, it has dispatched its fleet of fifteen automobiles to explore the countrysides and gather data on road conditions, not merely assembling it and giving it to one agency but passing it out to every hamlet, village and town through which it passes in order that natives might properly possess accurate information on their own problems—from the viewpoint of experts.

From the dissemination of road data the mission diverges to the preachment of a gospel of tire economy. Conservation is the theme of every message from the government to the citizen. It applies to automobile tires as well as to food, commodities and individual activities. Wherefore, the crews are endeavoring to pass out to motorists along the way information on the upkeep of their tires, the common abuses to which they are subjected and means of overcoming them. Manufacturers assert that it is their belief that fully $100,000,000 was spent needlessly on tires last year. Think how many rifles $100,000,000 would buy!

Conditions in the northern states are not the same as in the south; they are not the same in the west as they are in the east. Therefore a nation-wide test furnishes the surest and best study of the effect of types of roads and climatic conditions on tires. The Goodrich Co. uses all types of tires while making these experiments, fabric and cord in all sizes.

During its stay in the south the Goodrich fleet expects to cover 150,000 miles of roadways, dirt, concrete, macadam and brick, from which it should derive deductions of immense benefit to motorists and road builders.

Following the Snow Plow Into Louisville

Moving Into Nashville

British Special Tire Standards for Foreign Markets*

J. Hoy, the manager of the export department of one of the largest firms of tire manufacturers in Great Britain, is the author of a scheme to bring British tire manufacturers into line in a great effort to place the British export trade in tires on a sure and sound footing. The scheme, which involves the close cooperation of British manufacturers and the production of a standard British tire, has already been submitted to the trade associations, and was recently made public.

Apart from the returning menace of organized German competition after the war, Mr. Hoy points to the probability of the repeal in the United States of the Sherman Law, which does not permit of cooperation in manufacturing and selling goods, and suggests that from this direction also keen competition is likely to be met, making it necessary for British manufacturers to take immediate steps to meet the future situation.

The formation of an export trade "Kartel" he believes will present fewer difficulties than would have been encountered in a similar effort a few years ago. In the interval, manufacturers have become accustomed to cooperation in meeting the demands of the Ministry of Munitions and other Government departments, and there is also a clearer recognition of the nature of the competition which has to be faced. Great Britain failed before the war because of her lack of the sense of collectivity, and Germany succeeded, through her trade "Kartels," by pursuing the policy which has served her best in war—constantly feeling for the weak spot and then massing all her batteries.

Mr. Hoy has furnished the following statistics, which, he thinks, confirm his argument so far as the tire trade is concerned. His figures compare the business done in tires by the United Kingdom and by Germany in three Continental countries.

FRANCE (IMPORTS)

	1911. Francs.	1912. Francs.	1913. Francs.
U. K.....	4,922,400	3,368,700	3,701,250
Germany..	19,538,000	15,673,000	12,433,750

ITALY (IMPORTS)

	1911. Lire.†	1912. Lire.†	1913. Lire.†
U. K.....	3,031,000	16,601,600	2,317,500
Germany..	8,670,000	8,195,200	11,593,000

SPAIN (IMPORTS)

	1911. Pesetas.‡	1912. Pesetas.‡	1913. Pesetas.‡
U. K.....	244,816	86,385	89,251
Germany..	347,119	957,742	11,593,500

* From *The India Rubber Journal.*
† 20 lire are equal to about $3.80.
‡ 25 pesetas are approximately equivalent to $5.00.

In 1912 and 1913 large exports of tires, made by German concerns, were sent from Italy to France, hence the decreases in those years in the import by France of tires direct from Germany.

The scheme which Mr. Hoy proposes is outlined below.

"Some months ago I proposed to some of our leading tire manufacturers that they should bring the matter before their trade association. It may be accepted that the output of the British tire makers has trebled since 1914. At the request of the Government, manufacturers have extended their plants to such a degree that most of them have no clear idea at present as to how they are going to dispose of their over-production when peace is declared and the War Office requirements drop.

"The declaration of peace may see an increase in motor transport in this country, but even then the tire manufacturers will have to find a new market for at least 50 per cent of their total output. We know what that will mean if they pursue their pre-war methods. There will be a panic and cut-throat competition amongst British tire makers in foreign markets.

"The remedy is in the hands of the manufacturers themselves. Let them set aside petty trade jealousies and make this the foremost rubber-exporting country in the world by forming an export combine in which each firm will pool its supplies, after meeting the demand of the home market.

"The tires offered for export would not be sold as the product of Smith or Jones, but simply as a British tire, bearing a British trade mark selected by the Export Combine. The tire manufacturers would provide the capital for the Combine, pro-rata to the quantity of goods offered, and with a pro-rata distribution of profit.

"Instead of Smith, Jones, Robinson and Brown each having a depot in Copenhagen, Madrid or Melbourne, there would be one house in each city—belonging to the Combine.

"It has been suggested to me that the foundation of an Export Combine such as I have roughly outlined, would naturally result in the formation of a Trust composed of rubber manufacturers in this country for the regulation of the home trade.

Specialized Manufacture in Each Class of Goods

"I admit that such a Trust would be necessary, or, in the event of a complete Trust not being acceptable to the majority of the manufacturers, some working arrangement could be devised whereby certain factories would manufacture certain rubber articles. By this I mean that the various trade secrets now in possession of each manufacturer could be pooled to a 'Central Board of Direction,' and that one or more of the factories could be set aside for the manufacture of the pneumatic tire which, after comparison of the various formulæ, was found to be most satisfactory. This idea could then be carried through throughout the entire range of rubber manufacturing, one factory specializing solely on solid tires, another on pneumatic, and so on.

Motor Cycle Side Car Being Used to Transport Tires
(Press Illustrating Service)

"I recognize, of course, that the word 'Trust' has an ugly sound in the ears of the majority of users, but they cannot be unaware that the tendency of today all over the world is towards the establishment of co-operative societies and syndicates.

"It is noteworthy that quite recently the world's largest Match Trust has just been floated by the amalgamation of all the match factories in Sweden and their branches in Norway, England, and Russia, with a minimum capital of 45 million kroner, so by proposing this rubber trade syndication I sin in good company!

"At the meeting of the German Union of Technical and Scientific Societies, composed of thirteen associations and unions, Professor Dr. Wiedenfeld of Halle, stated that the old economic conditions prevailing before the war must not be allowed to return, and expressed himself in favor of a system of properly regulated syndication of industry. This view if confirmed by Edward E. Pratt, Chief of the Bureau of Foreign and Domestic Commerce at Washington, who in a recent address to business men stated that the various industries of Germany have been consolidated into cooperating groups until virtually all German industries have united as one organic producing and selling agency, backed by the full power of the great German banks and also by the organization of the German Imperial Government.

The Danger of Germany's Commercial Ambition

"If further proof be necessary, President Wilson, in his address to the American Federation of Labor at Buffalo, on Nov. 12, referred to the danger to the rest of the world of Germany's commercial ambition; an ambition sought to be carried out by the methods of German manufacturers and exporters under the patronage and support of their Government, constituting the same kind of competition which was held to be illegal in the United States—that is, the formation of Trusts.

"The whole tendency of modern industry is towards the establishment of manufacturing and merchandising cooperation. Whether or not the idea is popular in this country is a matter of little concern, because I am firmly convinced that the Government, rather than permit the wholesale dislocation of trade, will force on the manufacturers some such scheme is I have proposed."

Among Men in the Trade

P. L. Cornell of Diamond Joins Army

P. L. Cornell, advertising manager of the Diamond Rubber Co., New York, has resigned his position to enist in the Ambulance Corps of the United States Army. Before connecting with the Diamond Rubber Co. Mr. Cornell was general manager of the Westermann Advertising Agency.

J. Emmett Code, formerly assistant advertising manager, has been made manager of the advertising department of the Diamond Rubber Co.

W. K. Frederick Goes with Gryphon

W. K. Frederick has been appointed sales manager with the Gryphon Rubber & Tire Corp., New York. Mr. Frederick is a well-known figure in the tire world and especially among the large accessory and hardware jobbers throughout the United States. The sales policy of Mr. Frederick includes specialized marketing of the company's product through the large hardware and accessory jobbers, to which class of trade the Gryphon proposition offers unusually attractive features.

MacConnell with Hyatt Bearing Co.

C. E. MacConnell has joined the sales engineers' staff of the Hyatt Roller Bearing Co., Detroit, Mich. He was formerly advertising manager of the Detroit branch of the Goodrich Tire & Rubber Co.

A. A. Lightfoot Marathon Branch Manager

A. A. Lightfoot, formerly Pennsylvania representative for the Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, has been appointed division manager at Chicago, succeeding H. F. Smith, resigned.

M. E. Mason, Sales Manager of the Mohawk Rubber Co., Akron, Ohio, Who Has Just Completed His Twentieth Year in the Sales End of the Tire Business

Hopkins Manager of Firestone Branch

L. L. Hopkins has been appointed office manager of the Albany branch of the Firestone Tire & Rubber Co., to succeed G. E. Hoff. Mr. Hopkins comes to Albany from the Boston branch of the company, where he was in charge of the credit department.

Lehousse with Dreadnaught

L. L. Lehousse, one of the best-known tire men on the Pacific Coast, has been secured by Charles F. U. Kelly, Inc., New York City, general sales agent for Dreadnaught tires, as resident coast manager. He will handle the coast Dreadnaught business from headquarters at 2 Cancer Street, San Francisco, Cal.

Dunham, Carrigan & Hayden Co., San Francisco, has been given the Dreadnaught agency in that city, and will handle exclusively the product of the Dreadnaught Tire & Rubber Co., Baltimore, Md.

Goodyear Branch Changes

The Goodyear Tire & Rubber Co., Akron, Ohio, has announced the following changes in branch managers: P. A. Kerns, formerly branch manager at Butte, Mont., has been made manager at Buffalo, N. Y.; W. J. Peete, who has been handling Government business at Washington, succeeds Mr. Kerns at Butte; F. L. Morgan has been promoted from assistant manager at Philadelphia to manager of the Cleveland branch, succeeding F. N. Hammond; R. J. Davies, formerly city salesman at Jacksonville, Fla., is now manager of the Nashville (Tenn.) branch, succeeding E. H. Morris, who has entered Federal service.

Rubber Men Apply for S. A. E. Membership

Recent applications for membership to the Society of Automotive Engineers included eight from the Fisk Rubber Co., Chicopee Falls, Mass., as follows: J. D. Anderson, factory manager; Charles H. Desautels, foreman, mold equipment, engineering department; William Jameson, advisory engineer; George Henry Lewis, supervisor, experimental work; A. Melvon Marquette, assistant superintendent; John B. Maus, export manager; R. B. Naylor, chief chemist; A. W. Venner, superintendent.

Other applications included, W. E. Shively, experimental engineer, the Goodyear Tire & Rubber Co., Akron, Ohio; and James D. Tew, assistant superintendent, B. F. Goodrich & Co., Akron, Ohio.

Wield Made Assistant Sales Manager

Mr. F. H. Ayers, Sales Manager of The Fisk Rubber Company, Chicopee Falls, Mass., announces the appointment of Mr. William Wield as assistant sales manager.

Mr. Wield came with the Fisk organization over a year ago to do some special work for the Sales Department. Previous to his Fisk connection he was with the Hudson Motor Car Company, in New York City.

J. L. Cutler Resigns from Goodrich

After serving fifteen years as foreman of the machine shop at The B. F. Goodrich Co., J. L. Cutler has resigned. Fellow employes have presented him with a gold watch, chain and Masonic charm. Mr. Cutler is well known in rubber circles in Akron.

Voss Made Branch Manager

William Ralph Voss has become Davenport, Ia., branch manager for the Hawkeye Tire & Rubber Co., with headquarters in Davenport. Voss at one time served as traveling representative for the B. F. Goodrich Co.

Joseph Joins U. S. Army

H. Belden Joseph has resigned his position as assistant advertising manager with the Kelly-Springfield Tire Co., New York, to join the United States Army.

M. & S. Tire Shop has moved to 627 Van Ness Avenue, San Francisco, Cal.

Happenings of Interest to the Tire Trade

Annual Report of the Fisk Rubber Co.—Keystone Declares Dividend—New Automobile Handbook Out—Mason Sales Show Big Increase —To Curtail Auto Production 30 Per Cent.— Return Load Bureaus in Connecticut

Fisk Annual Meeting

The fifth annual report of the Fisk Rubber Co. was approved at the annual meeting of the stockholders in the company's offices at Chicopee Falls. The profit and loss and surplus account for the year ending Dec. 31, 1917, shows net profits of $3,578,484.57. This nearly doubles $1,836,829.86, the amount for the previous year.

J. D. Anderson, factory manager, was elected a vice-president at the meeting. The present board and officers were re-elected, with that addition. Mr. Anderson has been a member of the Fisk organization since early in 1915. He is one of the oldest rubber men in point of service in the country, having originally been connected with the Hartford Rubber Works, a branch of the United States Tire Co., since 1895. He was secretary of that company first and finally became its president. In the reorganization of the United States Tire Co., when the Hartford Rubber Works was consolidated, he was made general sales manager, and in that capacity he supervised the large organization and traveled extensively throughout the United States and Europe.

Mr. Anderson became associated with the Fisk Rubber Co. in May, 1915, assuming the position of sales manager. In March, 1916, he became factory manager, which position he still retains.

Keystone Declares Dividend

The Keystone Tire & Rubber Co., New York, has declared a regular quarterly dividend of 2 per cent and an extra dividend of one-third of one per cent on the preferred stock; also a regular quarterly dividend of three per cent on the common stock. All dividends are payable Jan. 2 to stockholders of record Dec. 22.

FISK ANNUAL REPORT

PROFIT AND LOSS AND SURPLUS ACCOUNTS FOR YEAR ENDING DEC. 31, 1917

Surplus, Balance December 31, 1916		$1,875,442.37
Add—		
Net profits for year ending December 31, 1917, after deducting manufacturing costs, depreciation, and interest on borrowed money, but before providing for 1917 Federal income and excess profits taxes		3,578,484.57
Nominal value of 25,500 shares of Federal Rubber Co. common stock, par value $100.00 each, received for sundry services, etc., for which no specific charge was made		1.00
		$5,453,927.94
Deduct—		
Dividends paid—		
First preferred stock	$631,750.00	
Second preferred stock	341,100.00	
	$972,850.00	
Surplus appropriated for retirement of first preferred stock	405,328.81	
Premium paid on 3,750 shares first preferred stock retired January 18, 1917	34,819.71	
Provision for insurance liability on stock and equipment at branches assumed by the company	30,000.00	
Payment of taxes applicable to prior periods	5,536.45	
		$1,448,534.97
Surplus, balance December 31, 1917		$4,005,392.97

ASSETS

Capital Assets—	
Land, buildings, machinery, etc., at Chicopee Falls and equipment in branches at depreciated values	$7,040,415.67
Manufacturing rights and leasehold property	106,030.99
Good will	8,000,000.00
Total	$15,146,446.66
Investments	284,622.63
Current Assets—	
Merchandise, raw, process and finished	$17,737,637.58
Tires under mileage contracts	68,561.01
Receivable, less bad debt reserve	6,262,541.01
Collateral notes—employes' stock subscription account	462,717.41
Cash	1,658,894.20
Total current assets	$26,190,351.21
Deferred Charges	365,348.35
	$41,986,768.85

LIABILITIES

Capital Stock—	
First Preferred Non Convertible	$4,025,000.00
First Preferred Convertible	5,000,000.00
Second Preferred	4,500,000.00
Common	8,000,000.00
	$21,525,000.00
Current Liabilities—	
Loans payable	$11,373,000.00
Accounts payable	3,311,683.01
Accrued wages	24,010.20
Dividends due, not paid	6,706.00
Total	$14,715,399.21
Reserves—	
Balance 1914 reappraisal	$104,577.23
Insurance liability assumed	40,608.26
Guarantee	215,462.37
Total	$360,647.86
Surplus—	
Appropriated for retirement of First preferred stock	$1,380,328.81
Surplus	4,005,392.97
	$41,986,768.85

New Automobile Handbook Out

The National Automobile Chamber of Commerce has issued its fifteenth annual Hand Book of Automobiles, in which are described, with illustrations and principal specifications, the products of the leading makers of motor cars in the United States who are members of the National Automobile Chamber of Commerce. To provide a method of comparison, the details of construction and equipment of passenger cars and trucks are given in uniform style and in the most concise form. Prices are given as of approximately Dec. 1. The book is of handy size, attractively printed and contains 225 pages of text.

Big Increase in Mason Sales

Sales of the Mason Tire & Rubber Co., Kent, Ohio, for the first quarter of the 1918 year show an increase of 700 per cent over the same quarter of 1917. January sales were reported to be the largest in the history of the company for any one month.

J. D. Anderson

Inspectors for Tires and Tire Fabrics

The United States Civil Service Commission announces open competitive examinations for an assistant inspector of rubber tires and an assistant inspector of fabrics for pneumatic tires for the Ordnance Department of the War Department.

These examinations are to be of the non-assembled type, in which competitors are not assembled for an examination, but are rated upon the subject of education and training, and experience, and corroborative evidence. Applications for these examinations are received at any time.

Return Load Bureaus in Connecticut

According to an announcement by William S. Conning, Chairman of the Committee on Motor Truck Transportation of the Connecticut State Council of National Defence, at a recent meeting of the highway Traffic Association of the State of New York, the State of Connecticut has in operation fourteen Return Load Bureaus in as many cities. The purpose of these bureaus is to relieve railroad congestion by acquainting all the shippers in the state of concerns or individuals who have motor truck equipment available for the overland haulage of goods.

The establishment of these Return Load Bureaus is an important step in putting motor transportation upon a commercial basis. Any shipper desiring to move goods between his own and any other city may through the Bureaus promptly get into communication with either motor truck transportation companies or private individuals owning trucks that are available for this work either on a contract basis or as separate loads. To Connecticut belongs the credit for the leadership in this move, no other state having as yet established a similar system.

There has been a great need for Bureaus of this kind, which are similar to the return load organizations in Great Britain. Until the formation of these bureaus, in Connecticut the state's manufacturers were at a loss to know what concerns they could call upon to handle these goods over the roads by motor trucks. The system has proved a great success and a great convenience for the many manufacturers of the state, who have thus been able to move many hundreds of thousands of tons of freight since last winter which otherwise could not have been taken from their shipping room platforms.

More than 700 trucks of one-ton capacity and over are now listed in the fourteen Return Load Bureaus. The cities in which these Bureaus are now in actual operation are as follows: Bridgeport, Bristol, Danbury, Greenwich, Hartford, Manchester, Meriden, Middletown, New Britain, New Haven, New London, Norwich, Stamford and Waterbury.

To Curtail Auto Production 30 Per Cent.

Curtailment of 30 per cent in automobile production for the present year was the most important action taken by the members of the National Automobile Chamber of Commerce at their semi-annual meeting, March 7, at 7 East Forty-second Street. Many of the large plants have already curtailed their production of motor vehicles to a large extent, in view of taking over the munitions work for the Government.

Several conferences have been held lately between the motor manufacturers and the War Industries Board at Washington with the object of arriving at a definite basis of curtailment. The suggestion that it should be cut to 50 per cent or more was regarded as too drastic by the manufacturers, in view of the essential needs of the motor industry to the country and the large demands being made by the Government and the allied nations for motor trucks and other vehicles for war transportation.

Hugh Chalmers, Vice-President of the National Chamber, presided, and at the close of the meeting he stated that the voluntary 30 per cent curtailment was entirely satisfactory to the War Industries Board and the Fuel Administrator. The National Automobile Chamber of Commerce is composed of 117 motor manufacturers, and nearly all of the large plants were represented at the meeting.

It was voted to dissolve the Automobile Industries Committee and to maintain in its stead a general headquarters in Washington in charge of Hugh Chalmers. Mr. Chalmers was a member of the former committee, which was formed last November to assist the War Industries Board in the selection of factories best adapted to the making of various forms of war munitions while maintaining the efficiency of the plants for the necessary motor requirements of the country. A staff of engineers will be kept at the national automobile headquarters to aid manufacturers in their work for the Government.

A resolution was passed indorsing the work of the recently formed Highways Industries Association, and William T. Metzger and Windsor T. White were appointed as members to represent the motor car and truck manufacturers.

A report on the two national automobile shows of the year, those at New York and Chicago, respectively, showed that for the first time in seventeen years the paid attendance was less than the record for the preceding year. The Monday closing order affected the Chicago show. The actual business transacted by dealers at the show was almost on a par with previous shows.

The Boston Automobile Show

The Boston automobile show was the last of a series of exhibitions, which despite the gloomy predictions of a few calamity shouters, have consistently proved successful. The exhibit of cars was comprehensive, while the accessories showing this year were unusually good. The show was especially notable for the strong showing of motor trucks, forty-five different makes of cars being on exhibition.

Adequate Motorcycle Equipment Necessary

At the annual convention of the Motorcycle and Allied Trades Association in New York, it was the unanimous sentiment that the first and only thing that should be considered was how the industry could help win the war. Motorcycles have been used in this war more extensively in Europe than in America, in military matters, and it was agreed that every effort should be made to equip our American armies with adequate motorcycle equipment. H. S. Quine, manager of the publicity department of the Goodyear Tire & Rubber Co., presided over the convention.

Goodyear Offers Stock to Employes

An opportunity to secure stock in the Goodyear Tire & Rubber Co., Akron, Ohio, has been offered to the company's employes, according to an announcement by President F. A. Seiberling. Each employe may buy shares of the second issue of 8 per cent. preferred stock, at par value of $100, paying $4 per month on his purchase. The stock may be redeemed by the company at any time and 10 per cent of it must be redeemed every year starting January 1, 1919.

The purpose of this sale to employes is to gain their direct interest in the company and its future, and to obtain for the men a fixed dividend as large as is permitted in the state. The 8 per cent dividend is payable quarterly. The stock carries no voting power with it except in the case of liquidation of the company.

Gammeter Starts Truck Service

In order to overcome the serious handicaps due to the uncertain transportation problems of the present time, W. F. Gammeter, Cadiz, Ohio, maker of the Universal steel calender stock shells has put a two-ton truck into service primarily to procure supplies but also equipped to make long or short distance delivery of orders. Such deliveries will be made at a reasonable cost to customers and to further aid transportation the truck will be used to carry the products of customers to any point on the return trips.

Mansfield Minstrel

On Feb. 27, 28 and March 2, the employes of the Mansfield Tire & Rubber Co. gave a minstrel at the Opera House at Mansfield, Ohio. The proceeds were donated in equal parts to the Red Cross, the Y. M. C. A. and the Knights of Columbus.

The first part was the "Garden of Loveliness." The olio was opened with a dancing number by Miss Ruth Ludwig, a Mansfield girl. The afterpiece represented a scene on the banks of the Suwannee River. The entire production was capably supervised by Sank & Berrian, minstrel producers, of Columbus, Ohio. The settings and costumes were colorful and well carried out. A floral piece was presented to the entertainers by G. W. Henne, manager of the Mansfield Co.

Among those who took a prominent part in the minstrels were Sheridan Carroll, James Hoppe, Conrad Kalbfleisch, Edward Fischer, Steve Berrian, Roy Zimmerman, Marty Hogan, George Sank, Ted Carroll, Miss Ruth Ludwig, Gus Doran, Ben Leary and Charles Mink.

Harry Bolus was master of ceremonies and Miss Olive Smiley was musical directress. On the whole the affair was a huge success.

STAGE SCENE AT MANSFIELD MINSTREL SHOW

MARKETS

Manufactured Rubber Goods

NEW YORK, March 8, 1918.

With unusual abruptness the weather moderated from the extreme cold of the past several weeks and last fortnight leaned toward spring. With corresponding rapidity trade responded to weather conditions and assumed almost a spring-like aspect. Calls for prices on all sorts of goods are becoming more frequent and the prospects of business are promising well, though there are still many complaints concerning freight embargoes, which are said to be getting worse within the last week, especially in the case of parcels by express. In New York City, for instance, the various large express companies in this city frequently will not receive packages when carted to their own depots by shippers.

In the Middle West business is reported to be about normal for the season of the year in retail circles. The wholesale trade is only fair, being still interfered with to some extent by the railroad situation. While freight conditions have somewhat improved in the last fortnight, jobbers and manufacturers are still having a great deal of trouble because of embargoes in getting raw materials and in shipping goods to customers.

In New England little change is to be noticed in the condition of business in the last fortnight. Inquiries show that there is no appreciable betterment in deliveries, and in some respects the situation is worse than it was a month ago.

To recapitulate, business conditions throughout the country are such that the trade is very optimistic in regard to the future.

MECHANICAL GOODS

Little change is to be noticed in the mechanical rubber goods trade. Business is good in general, there is increased activity in Spring goods, but the warmer weather has not developed business on these lines as it should have done, there appears to be a reluctance among retailers to purchase goods before the consumer demand begins.

GARDEN HOSE

Jobbers report that they have received unusually large orders for garden hose for both immediate and future shipments, and some fear that, owing to the scarcity of fabric which enters largely into the manufacture of garden hose, manufacturers may not be able to make enough hose to meet the demand. It is also rumored that prices may become higher before the selling season is far advanced. On the other hand, New England reports that garden hose sales for this season are backward, many dealers apparently having carried over some hose from last year. Boston reports an increasing demand for the ⅝-inch size, which appears to be growing in favor. The following quotations are from jobbers' stocks: ¾-inch hose, 11¾ and 9¾ cents per foot; ⅝-inch, 16, 11¼, 10½ and 9¼ cents per foot; ½-inch, 10¾ and 8¾ cents per foot.

TIRES

The outlook for the pleasure vehicle trade this year is still somewhat uncertain. Some believe that the Government may ask that pleasure cars be operated only on certain days, while others go so far as to say the Government may issue an order prohibiting the use of pleasure cars this year altogether, in order to conserve the supply of gasoline. However, jobbers are now taking orders for both automobile tubes and casings for Spring delivery, but the volume of business is not very heavy.

On the other hand, tires for commercial vehicles, the solid rubber kind, are being produced and sold in larger quantities than ever before in the history of the industry.

Bicycles are coming back strong though prices are from $2 to $4 higher than a year ago and good business is anticipated in tires for these two-wheeled vehicles.

FOOTWEAR

The Government has served notice of further large needs in rubber footwear and it is said that the capacity of the factories will be taxed until June with Government work. This will probably result in a severe shortage of arctics and other heavy goods next season, and as labor will be taken from other work to fill Government orders, it is likely that there will be a curtailment in the output of light rubbers, though a shortage of these is hardly to be expected.

DRUGGISTS' SUNDRIES

Medical and surgical supplies necessary for army base hospitals, field hospitals, Red Cross Associations and the Navy, while not amounting in dollars and cents to colossal figures, are nevertheless being ordered in such quantities as to tax the productive capacity of manufacturers of druggists' sundries. Our Allies are also making heavy demands on the capacity of our factories for medical and hospital rubber goods, the manufacturers have all offered their organizations and their outputs to the Government and have agreed to give preference to Government requirements. This preference has already resulted in some delays to the regular buyers of druggists' sundries who are unable to get their orders executed with usual promptness and are obliged to be patient. Alive to the fact that the Government's requirements are more likely to increase than to decrease many jobbers have placed large orders to be filled between Government orders. Retailers, however, are still reluctant to purchase goods before the consumer demand begins.

Cotton, Yarn and Fabric

NEW YORK, March 8, 1918.

The general course of the raw cotton market has again been upward during the past fortnight, with moderate reactions which were promptly recovered. Yesterday the undertone was very strong.

There continues to be a little speculation connected with the advances, the basis of which is the constant buying by trade interests as hedges against forward deliveries. This demand has now extended largely to the new crop positions, showing that manufacturers are contracting for their output for months ahead.

There has been no special developments as to the next crop, except that advices coming in are more insistent that in the Atlantic States, at least, considerable acreage will be diverted from cotton to foodstuffs, with a large increase in the cultivation of peanuts. In the Western belt the outlook seems to be for some increase of cotton acreage, dependent on the weather, especially in Texas. It is too early to attempt any general averaging of the entire belt, but it seems to become more probable daily that the inducement of the high prices of cotton will be practically offset by the urgency of more food, the high prices of all the farmers' requirements, and the scarcity of labor, which in some districts seems to be a very serious matter.

Barring some unforeseen occurrence, there would seem to be little room for any decline of consequence in cotton values.

EGYPTIAN COTTON

According to a report from Alexandria, dated January 18, the futures market there was growing firmer owing to the smallness of the second tender, which amounted to only 3500 cantars against 5000 cantars for the first tender.

Shipping facilities have been meager, with the result that stocks in Alexandria

ALEXANDRIA STATISTICS FOR THE WEEK ENDING JAN. 25, 1918

	Arrivals. Cantars.	Exports (Bales) England.	Continent.	America.	Exports. Cantars.	Total Stock. Cantars.
This week	137,032	4,874	250	.....	39,435	*3,570,995
Same week 1917	101,030	9,765	6,341	4,242	155,388	1,170,437
Same week 1916	92,743	12,876	15,654	12,637	312,253	1,377,010
Since Sept. 1, 1917	4,216,628	211,465	24,305	13,637	1,910,633	.....
Same time 1916	4,070,323	223,833	72,270	88,454	2,937,886	.....
Same time 1915	3,712,605	213,167	96,118	114,964	3,225,925	.....

* 61,000 Cantars to Japan via Port Said deducted.

...e further increased and have now reached the high figure of about 2,500,000 cantars, against the previous high record of slightly over 2,800,000 cantars.

The demand from abroad has been moderate, and this is reflected in the spot market, where only a very restricted business has been done, at prices generally a half dollar cheaper. New regulations are to be put in force to control shipments to America.

SEA ISLAND

There has been but a small demand for cotton in the Savannah market. A fair demand is reported at interior points in the Sea Island belt. Most of the interior sales were made as average extra choice, while the spot cotton was sold on grades. There is still no sign of any material weakening, although more cotton is being offered by holders.

From reliable sources it is reported that a decrease of about 24 per cent in cotton acreage for the coming season is probable.

YARNS

The scarcity of the commodity and better civilian demand are said to be responsible for the advance in cotton yarn prices which has occurred this week. Yarn houses report difficulties in getting spinners to accept offers, the spinners being so well supplied with orders that they are only willing to take on more at full prices. There are many inquiries for yarns, particularly from mills that have not covered on new Government contracts.

FABRICS

One of the fortnight's big features in textile circles is the unofficial statement that it is the purpose of the purchasing powers under the new regime at Washington to give publicity to the proposals and awards by the Government, just as the Navy Department has done from the opening of hostilities. In this way it will be possible for civilian buyers to arrive at an accurate estimate of what the mills can do for them in supplying their needs. As matters have been going, all sorts of fears have arisen, and it has been possible for speculators to raise prices for fabrics faster than stocks rise in an inflated market.

TIRE FABRICS

There have been a few inquiries in the tire fabric market, but otherwise matters are about the same as they were a fortnight ago.

The mills have all the business they can handle and are, consequently, not worrying about orders.

HOSE AND BELTING FABRICS

The Government has taken over the output of an additional number of mechanical duck looms. Transportation delays continue serious, and add to the difficulties of the mills in supplying the small portion they can of their regular customers' needs.

DRILLS, OSNABURGS AND SHEETINGS

The scarcity of these fabrics is increasing daily, in many cases mill representatives are said to have ceased to act on bids. They receive them only to the extent of passing them on to the mills.

GARMENT CLOTHS

The garment cloth market is exceedingly firm owing to the great demand for constructions intended for proofing for raincoats for soldiers, and lining fabrics for these coatings. The new Government orders are being apportioned among the mills that can make them and agents are busy trying to arrange for a proper care of civilian orders that have to be displaced to make room for Government work.

BURLAPS

Burlaps remain steady on a quiet market. Fundamentally conditions are not changed, and many problems remain to be solved before the next few months can be passed. Calcutta is proving a puzzle to many importers and the high prices are putting the American buyer in a difficult position. In New York it is becoming felt that higher priced goods than those lately sold are soon to come on the market, and holders are consequently increasing in firmness.

An important Dundee shipment of burlap was lost when the SS. "Tiberia" was sunk by a submarine last week. Wide burlaps are already scarce and British prohibitions have removed hopes of further importations. This vessel carried goods which American merchants had had much difficulty in obtaining licenses for, and is thought to have been the last shipment from Dundee which could be expected.

NEW YORK QUOTATIONS

TIRE FABRICS.

17¼-ounce Sea Island, combed, sq. yd.	$1.62@1.73
17¼-ounce Egyptian, combed	1.24@1.60
17¼-ounce Egyptian, carded	1.20@1.25
17¼-ounce Peelers, carded	1.00@1.25
17¼-ounce Peelers, combed	1.05@1.10

MECHANICAL DUCKS

Hose (nominal)	.65@ .70
Belting (nominal)	.65@ .70

DUCKS

Single Filling (pound basis) lb.	.64
Double Filling (pound basis)	.75

DRILLS

37-inch 2.35-yard yd.	.28½
37-inch 2.75-yard	.24
37-inch 3.00-yard	.23
37-inch 3.25-yard	.22
37-inch 3.50-yard	.20
37-inch 3.95-yard	.17¼
37-inch 2.00-yard Southern lb.	.55
38-inch 2.00-yard Northern	.56½
40-inch 2.47-yard Northern yd.	.28
40-inch 2.47-yard Northern	.35
52-inch 1.90-yard Southern	.37
52-inch 1.90-yard Northern	.34

SHEETINGS

40-inch 2.35-yard yd.	.28
40-inch 2.50-yard	.26
40-inch 2.85-yard	.24
40-inch 3.00-yard	.23
40-inch 3.25-yard	.23
40-inch 3.60-yard	.20
40-inch 3.75-yard	.18½
40-inch 4.25-yard	.16½
38-inch Jacket Cloths yd.	.21@23

TWILLS FOR PROOFING

37-inch 2.85-yard yd.	.23
37-inch 3.25-yard	.28
37-inch 2.10-yard	.28½

COTTON STOCKINETTES

(52-inch)

E—11½-ounce yd.	.60@	.65
A—11 -ounce	.70@	.80

BURLAPS

(Spot Carload Lots)

40-inch 8 -ounce	17.50
40-inch 10 -ounce	21.00
40-inch 10½-ounce	21.50

Chemicals and Compounding Materials

NEW YORK, March 8, 1918.

The feature in the market was the announcement made by leading producers of zinc oxide to the effect that contract prices for both the American and French process zincs, for delivery over the second-quarter of the year, would show no change from those issued for the first-quarter. The position of zinc ore and spelter has undergone but little change during the first-quarter period and a revision in prices for zinc oxide was therefore unwarranted. Further weakness was in evidence for caustic soda, due to liquidation by speculators. Inability to obtain export licenses curtailed business. Sulphur ruled firm under moderate offerings for immediate shipment, as the transportation situation is holding up deliveries. Antimony sulphurets ruled firm. Higher prices are noted for glues, shellac, linseed oil and waxes. Turpentine, aniline oil, rosin and pitch closed easier.

ANTIMONY SULPHURETS

Deliveries on old contracts are going forward at a normal rate and with stocks on hand moderate prices are holding steady for practically all brands. Quotations are unchanged on the basis of 25 @ 27c per pound for the red. Crimson sulphurets are held from 45 to 53c per pound, as to brand.

ANILINE OIL

A little irregularity was noted in the market for aniline oil, and scattered lots changed hands at concessions. Producers offer aniline oil, in round-lots, at 26 to 27c per pound, drums extra, immediate and forward shipment.

BENZOL

There was a good inquiry for immediate shipment benzol, but trading in futures remained quiet as an easy feeling was noted. Producers offered pure benzol for immediate shipment from works, in tanks, at 35c per gallon. For benzol in drums prices ranged from 38 to 40c per gallon.

CAUSTIC SODA

Freer offerings of resale material had a depressing influence upon the market and prices again closed lower. Solid 76 per cent caustic soda was offered towards the close at 4½ to 5c per pound, as to quantity and seller.

COLORS

An advance in quicksilver was reflected in a firm market for English vermilion and prices in most instances were wholly nominal. Stocks of blacks are light and prices for the various grades are being firmly maintained. Blues are firm, but quotably unchanged.

LEAD PIGMENTS

There was a higher market for pig lead, which strengthened the market for the lead pigments. Up to the close, however, corroders announced no changes in the schedule of prices. Demand for lead pigments has been sub-normal.

SULPHUR

Until improvement can be noted in the shipping situation little change is expected in prices for refined sulphur. The deliveries are slow and prices are being firmly maintained on the basis of $3.85 per 100 pounds for refined flour, in carlots, barrels included. Crude sulphur at the mines is holding at $35 to $37.50 per ton.

ZINC OXIDE

Producers announced that contract prices for both the American and French process zinc oxide, for delivery over the April-June period are unchanged compared with those which obtained over the first quarter. XX zinc oxide, for delivery to rubber manufacturers only, on contract, is quoted at 10¼ @ 10½c per pound. French process is holding at 13 to 14c per pound, on contract. Spot prices are wholly nominal, as high as 13⅞c per pound having been paid for American process.

Prices Current for Chemicals, Fillers, Colors, etc.

Acetone	lb.	.39 @	.40
Accelerator, in drums	lb.	.80 @	1.00
Acids, Acetic, 56%	lb.	.11 @	.12
Carbolic, C. P.	lb.	.55 @	.57
Cresylic, 95%	gal.	1.10 @	1.15
Muriatic, 20 deg.	lb.	.02 @	.02¼
Muriatic, 22 deg.	lb.	.03 @	.03½
Nitric, 42 deg.	lb.	.09 @	.09½
Nitric, 40 deg.	lb.	.08½ @	.08¾
Sulphuric, 60 deg.	lb.	.01¾ @	.02
Tartaric, crystals	lb.	.78 @	.78½
Aluminum Flake	ton	28.00 @	30.00
Aniline oil, bulk basis	lb.	.27 @	.27½
Antimony, metal spot	lb.	13.25 @	13.50
Oxide	lb.	15.00 @	17.00
Sulphuret, red	lb.	.25 @	.26
Sulphuret, golden	lb.	.26 @	.28
Sulphuret, crimson	lb.	.45 @	.50
Asbestos	ton	35.00 @	45.00
Asphaltum, Egyptian	lb.	.22 @	.28
Domestic	ton	20.00 @	26.00
Barium sulphate, technical	lb.	.04¼ @	.04¾
Sulphide	lb.	.06¾ @	.07¼
Barytes, prime white imported	ton	*38.00 @	42.00
white, domestic	ton	30.00 @	33.00
off color, domestic	ton	19.00 @	21.00
Benzol, pure, bulk	gal.	.35 @	.40
Beta-naphthal, sublimed	lb.	.85 @	.90
unsublimed	lb	.65 @	.70
Blacks, Drop	lb.	.08 @	.15
Ivory	lb.	.16 @	.30
Carbon gas, cases	lb.	.22 @	.30
Lampblack R. M.	lb.	.05 @	.07
Mineral blacks	ton	28.00 @	32.00
Blues, Prussian	lb.	.65 @	1.35
Soluble (potash)	lb.	1.35 @	1.60
Ultramarine	lb.	.18 @	.40
Browns, Umber, Turkey, burnt, powdered	lb.	.04 @	.05
American, burnt	lb.	.03½ @	.03¾
Cadmium sulphide, yellow	lb.	2.00 @	2.25
Carbon, bisulphide, bulk	lb.	.08 @	.08½
tetrachloride, drums	lb.	.15½ @	.16
Caustic Soda, 76@78%	lb.	.04½ @	.05
Chalk, precipitated, extra light	lb.	.05 @	.05¾
light	lb.	.04¾ @	.05¼
heavy	lb.	.03¾ @	.04¼
China clay, domestic	ton	18.00 @	22.00
imported	ton	35.00 @	40.00
Fossil flour	lb.	.03¾ @	.05
Gilsonite	ton	40.00 @	44.00
Glue, extra white	lb.	.65 @	.75
medium	lb.	.28 @	.34
low grade		.15 @	.20
Glycerine, C. P. (drums)	lb.	.68 @	—
Graphite, flake (bbl.)	lb.	.18 @	.20
powdered (bbl.)	lb.	.13 @	.15
Green, chrome, R. M.	lb.	.12 @	.16
Ground glass (fine)	lb.	.03 @	—
Hexamethylene	lb.	1.15 @	1.17
Infusorial earth, powd'd.	ton	60.00 @	—
bolted	ton	70.00 @	—
Iron oxide, red, reduced grades	lb.	.05 @	.06
red, pure, bright	lb.	.11 @	.13
Lead, red oxide of	lb.	.10 @	.10½
sublimed blue	lb.	.08½ @	.09
white, basic carb.	lb.	.09 @	.09½
white basic sulph.	lb.	.08½ @	.09
Lime flour	lb.	.01½ @	.01¾
Litharge	lb.	.09½ @	.10
English	lb.	*.12 @	.13
sublimed	lb.	.09¼ @	.09¾
Lithopone, domestic	lb.	.06½ @	.07
Magnesia, carbonate	lb.	.11½ @	.13
calcined, heavy	lb.	.11½ @	—
calcined, light	lb.	.70 @	—
Magnesite, calcined, pwd.	ton	65.00 @	70.00
Mica, powdered	lb.	.03¾ @	.04¾
Mineral rubber (asphaltum base)	ton	50.00 @	65.00
Naphtha, motor gasoline, (steel bbls.)	gal.	.24 @	—
68 @ 70 degrees (steel bbls.)	gal.	.30 @	—
70 @ 72 degrees (steel bbls.)	gal.	.31 @	—
73 @ 76 degrees (steel bbls.)	gal.	.33 @	—
machine (wood bbls.)	gal.	.41 @	—
Oil corn, crude	cwt.	18.75 @	19.00
corn, refined	cwt.	22.35 @	22.65
linseed (bbl.)	gal.	1.49 @	1.51
palm, Lagos	lb.	*.34 @	.34½
pine, yellow	gal.	.45 @	.46
rapeseed, refined	gal.	1.70 @	1.75
rapeseed, blown	gal.	1.75 @	1.80
rosin, first rectified	gal.	.42 @	.43
tar (commercial)	gal.	.30 @	.32
Orange mineral, American	lb.	.13 @	.13½
imported	lb.	*.15 @	.20
Paraphenylenediamine	lb.	3.00 @	3.50
Petrolatum, bbls., amber	lb.	.05 @	.05½
pale yellow	lb.	.05¼ @	.05½
Pine tar, kiln	bbl.	12.50 @	13.00
Pitch	bbl.	4.50 @	4.60
Plaster of paris	bbl.	2.00 @	2.50
Red, Tuscan	lb.	.24 @	.30
Indian (reduced)	lb.	.06 @	.07
Standard	lb.	.08 @	.11
Rosin, common to good @ 280 lbs.	bbl.	6.60 @	6.80
Rotten stone, powdered	lb.	.03 @	.04½
Rubber, substitute, black	lb.	.12 @	.16
white	lb.	.14 @	.22
brown	lb.	.18 @	.24
Shellac, fine orange	lb.	.68 @	—
T. N.	lb.	.62 @	—
Bleached ordinary	lb.	.58 @	—
Bleached, bonedry	lb.	.70 @	—
Silex (silica)	ton	24.00 @	34.00
Soapstone, powdered	ton	12.00 @	20.00
Starch, corn, powdered	lb.	5.00 @	5.10
Sulphur, crude	ton	*50.00 @	..
refined, flour, per 100-pounds, in bbls.		3.85 @	4.40
roll		3.70 @	4.15
commercial		3.25 @	3.50
Talc, American	ton	15.00 @	18.00
French	ton	22.00 @	30.00
Toluol, pure, in drums	gal.	*5.25 @	5.75
Tripolite earth	ton	60.00 @	65.00
Turpentine, pure gum—spirits	gal.	.43½ @	.44
wood	gal.	.40 @	.42
Venice, artificial	gal.	.12 @	.13
Vermilion, English	lb.	*2.00 @	2.10
Wax, beeswax, crude yel.	lb.	.36 @	.38
ceresin, white	lb.	.18 @	.19
carnauba, No. 3	lb.	.62 @	.64
Wax, Montan	lb.	*.35 @	.40
ozokerite, black	lb.	.75 @	.80
ozokerite, green	lb.	*.85 @	.95
Paraffin, refined, 118/120 M. P. (bbls.)		.12 @	—
Paraffin, 123/125 M.P.	lb.	.13 @	.13½
128/130 M.P.	lb.	.13½ @	.13¾
133/136 M.P.	lb.	.14¾ @	.15
Crude, 120/122 M.P.	lb.	.09½ @	.09¾
124/126 M.P.	lb.	.09¾ @	.10
Whiting, commercial	cwt.	.95 @	1.05
Alba	cwt.	1.00 @	—
Whiting, Paris, white, American	cwt.	1.25 @	—
English cliffstone	cwt.	1.50 @	—
Yellow chrome	lb.	.23 @	.25
Zinc oxide, American process, horsehead brand	lb.	†.10½ @	.10¾
selected	lb.	†.10¾ @	.11
"XX red"	lb.	†.10¾ @	.10¾
French process, green seal	lb.	†.13½ @	.13¾
red seal	lb.	†.13 @	.13¾
white seal	lb.	†.14 @	.14¾
Zinc substitutes	ton	30.00 @	35.00
Zinc, sulphide, pure	lb.	*.08 @	—

†Contract prices. *Nominal.

Crude Rubber

NEW YORK, March 8, 1918.

An easier tone developed in the market for crude rubber in the last fortnight, prices closing from 1 to 2 cents per lb. lower for the principal grades. Both buyers and sellers were disposed to hold off pending developments in regard to the licensing of imports. So far nothing definite is known regarding the Government's attitude covering the importation of crude rubber, and opinion in the trade differs greatly as to the ultimate outcome.

Importers, as a rule, are inclined to look for a curtailment in imports under Government regulation, and for this reason they are greatly disappointed in the downward tendency of prices. Manufacturers, on the other hand, are well covered by existing contracts, and with stocks on hand liberal, and business in finished products sub-normal, they fear no shortage in the supply of the crude material. Conflicting opinion resulted in a quiet period and prices for crude rubber went off in all positions.

London prices for plantation rubber moved within a narrow range. Stocks there are ample, despite the submarine losses. Quite a little rubber, originally destined for Russia, is being held by London interests. First latex pale crepe settled at 28¼d. per lb., which compares with 27¾d. per lb. two weeks previous. Smoked sheets underwent no change, closing at 27¼d. per lb., prompt shipment.

Spot prices for plantation rubber in this market art still from 3 to 5 cents higher than futures, which is explained by the delay in obtaining shipments overland from Pacific Coast points. First latex pale crepe closed at 56c. per lb., spot delivery; 54c. per lb., April-June delivery, and at 51½c. per lb. for July-September. Ribbed smoked sheets on the spot maintained a slight premium over first latex. Smoked sheets, ribbed, for July-September shipment, was available at 50@51c. per lb.

The arrival of several shipments of Brazilian rubber brought out slight selling pressure and the market closes with up-river fine offering at 56c. per lb., spot and nearby, and at 55½c. for April-June delivery. The medium grades went off to the extent of 2c. per lb., up-river coarse closing at 35c. per lb., with Caucho ball at 34c. per lb. Islands coarse and Cameta were inactive, with sellers at 24c. per lb., spot and nearby delivery.

Weakness in Brazilian rubber was reflected in slightly lower prices for Central American grades, Corinto closing easy at 35c. per pound, with Esmeralda at 34½@35c. per lb. Importations of Centrals have been light. Guayule rubber is featureless, holding at 26c. nominal.

Practically no business is passing in the African grades, stocks being scanty.

	Spot.	April-June.	July-Sept.
Para—Up-river fine lb.	56	55½	..
Up-river medium	52	52	..
Up-river coarse	35	34½	..
Caucho ball	34	34	..
Islands fine	47	46½	..
Islands coarse	24	24	..
Cameta	24	24	..
Maderia fine	59	..	..
Ceylons-Smoked sheets, ribbed.	56½	53½	50
Smokers sheets, plain	54½	52½	48
First latex pale crepe	56	54	51½
Amber crepe	48	47	45
Clean brown crepe	45	44	43
Centrals—Corinto, prime	35	..	..
Esmeralda, prime	35	..	..
Mexican scrap	34	..	..
Balata sheets	*82	..	..
Balata, block Panama	53	..	..
Guayule	26	..	..
Africans—Rio Nunez, string	*62	..	..
Massai, red	*48	..	..
East Indian Pontianak	12¼	..	..
Palembang	12½	..	..

* Nominal.

Scrap Rubber

NEW YORK, March 8, 1918.

Business in the scrap rubber market continues on a hand-to-mouth basis, but a steady feeling prevails in the trade and there are no important price changes to record.

The following prices were paid for scrap rubber, delivered at the reclaiming mill:

Boots and shoes	9 @ 9½
Arctics, trimmed	7
Arctics, untrimmed	6
Tires—Automobile	5½
Bicycles, pneumatic	5
Hose, mixed	1¾ @ 2
Air brake	5
Inner tubes, No. 1	20 @ 21
Inner tubes, No. 2	10½
Inner tubes, red	10½

Rubber Imports

IMPORTATIONS OF CRUDE RUBBER INTO THE UNITED STATES DURING FEBRUARY, 1918

Figures Compiled by The Rubber Association of America, Inc., 17 Battery Place, New York City. (Estimated net weights.)

PLANTATIONS		AFRICANS	
From	*Tons.*	*From*	*Tons.*
Liverpool	181	Hull	22
London	63	Bordeaux	46
British India	72	Lisbon	6
Singapore	4,270		
Colombo	510	Total	68
Batavia	1,296	CENTRALS AND GUAYULE	
Sourabaya	552	*From*	*Tons.*
Penang	537	Centrals (Mexico & Cen. America	79
Japan & others	2,225	Guayule (Mexico)	120
Total	9,715	Total	199

MANICOBAS		PARAS	
Rio de Janeiro	5	Manaos	843
Santos	13	Paras	975
		Rio de Janeiro	608
Total	18	Santos	306
		Iquitos	274
		Bahia	91
		Paramaribo	11
		Total	3,108

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons.		*Tons.*
Waste	212	Miscellaneous	
Balata	59	Gum	719

COMPARISON 1917-1918

	February, 1917.	*February, 1918.*
Plantations	7,224	9,715
Paras	1,977	3,108
Africans	660	68
Central	138	79
Guayule	49	120
Manicobas and Matto Grosso	114	18
Total	10,162	13,108

ARRIVALS PLANTATIONS FOR FEBRUARY, 1918, SHOWING PORTS OF ORIGIN AND DESTINATION

Singapore	New York	19
Singapore	San Francisco	508
Singapore	Seattle	848
Singapore	Tacoma	2,781
Singapore	Vancouver	123
Penang	Seattle	80
Penang	Tacoma	227
Penang	San Francisco	230
Batavia	San Francisco	644
Batavia	New York	652
Sourabaya	San Francisco	420
Sourabaya	New York	132
Japan and others	Vancouver	1,258
Japan and others	Seattle	378
Japan and others	Tacoma	9
Japan and others	New York	340
Japan and others	San Francisco	240
Colombo	New York	439
Colombo	San Francisco	15
Colombo	Port of Cleveland	56
British India	Port of Cleveland	72
London	New York	63
Liverpool	New York	181
Total		9,715

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports—		
New York		1,826
Pacific Ports—		
San Francisco	2,957	
Seattle	1,306	
Tacoma	3,017	
Vancouver	1,381	
		7,761
Port of Cleveland		128
		9,715

American Rubber Patents

ISSUED FEBRUARY 12, 1918.

1,255,876—To James Ellis Hale, Akron, Ohio. Cushion for vehicle wheels.

1,255,903—To William C. Martineau and Clarence P. Martineau, Albany, N. Y. Tire.

1,255,974—To Henry Anhaltzer, Pittsburgh, Pa. Tire.

1,255,981—To William F. Brown, Denham Springs, La. Tire-tool.

1,256,011—To John R. Gammeter, Akron, Ohio, assignor to the B. F. Goodrich Co., New York, a corporation of New York. Endless belt and method for making the same.

1,256,015—To Walter C. Guild, Marionville, Mo. Automobile inner-tube protector.

1,256,160—To Durfee O. Parish, Leroy, Colo. Anti-skidding device.

1,256,316—To John H. Heeran and Garry H. Heeren, Alcester, S. D. Demountable rim.

1,256,324—To Edwin R. Jump, Newton, Mass. Waterproofed material and method of waterproofing.

1,256,496—To Henri Olivier, Paris, France. Vulcanization of India-rubber and other similar substances.

ISSUED FEBRUARY 19, 1918.

1,256,520—To Edward J. Coughlin, Passaic, N. J., assignor to the New York Belting & Packing Co., a corporation of New York. Hose.

1,256,594—To Augusto Rodal, Habana, Cuba. Safety-suit for aviators.

1,256,649—To Elmer F. Berry, Marion, Ohio. Mold for applying rubber soles to boots and shoes.

1,256,659—To James A. Cameron and Gustaf Birger Birch, Brooklyn, N. Y., assignors to Cameron Machine Co., Brooklyn, N. Y. Machine for making surgeons' bandages.

1,256,664—To Samuel Cleland Davidson, Belfast, Ireland. Machinery for rubber and the like.

1,256,704—To John C. Lauritzen, Akron, Ohio. Vulcanizer.

1,256,716—To Thomas Midgley, Worthington, Ohio, assignor to Morgan & Wright, Detroit, Mich. Tire-tread building machine.

1,256,729—To Joel A. Reese, Atlanta, Ga. Anti-skidding device for vehicles.

1,256,732—To John Rowe, Casey, Iowa. Non-skid device for tires.

1,256,750—To Harry Weida, Highland Park, N. J., assignor to the India Rubber Co. Hard-rubber battery-jar and process of manufacturing same.

1,256,763—To Arnold Avery, Mallorytown, Ont., Canada. Tire-protector.

1,256,841—To William C. Stevens, Summit Co., Ohio, assignor to the Firestone Tire & Rubber Co., Akron, Ohio. Quick-acting chuck.

1,256,877—To Garrett John Couchois, Rutherford, N. J., assignor to Couchois Tire Corp., New York. Resilient tire.

1,257,004—To Herbert Alfred Humphrey, Westminster, England, assignor to Humphrey Gas Pump Co. Method of compressing elastic fluid.

1,257,167—To Oscar Anton Wiberg, Finspong, Sweden, assignor to Aktiebolaget Ljungstroms Angturbin, Stockholm, Sweden. Elastic fluid turbine.

1,257,204—To Phillip Ernenwein, New York. Rubber tire.

1,257,251—To Franklin W. Kremer, Rutherford, N. J. Pneumatic auto tire.

1,257,264—To Charles E. McClay, Los Angeles, Cal. Demountable-rim-securing device.

1,257,292—To Harold R. Murdock, Naugatuck, Conn., assignor to Rubber Regenerating Co. Process of reclaiming rubber.

1,257,296—To Rudolph T. Windt, St. Louis, Mo. Lock for demountable rims.

Incorporations

Rocky Mountain Tire Service, New York; capital, $10,000; incorporators: A. Skillman, A. G. Thanum, A. Forshay.

New Jersey Mechanical Rubber Corp., New York; capital, $5,000; incorporators: M. J. O'Connel, C. Watson and A. L. Burkhart.

Walters Rubber Co. of New York, Brooklyn, N. Y.; capital, $5,000 to $20,000.

Quick Tire Service, Inc., New York; capital, $25,000; to deal in rubber goods of all kinds; incorporators: A. Foshay, A. G. Tahnem and Russell Goldmen, all of New York.

The Great Republic Tire & Rubber Mfg. Co., Muskogee, Okla.; increase of capital from $100,000 to $500,000.

Pioneer Rubber Specialty Co., Akron, Ohio; increase of capital from $25,000 to $100,000.

The Howe Rubber Co. of California; capital, $200,000; incorporators: C. A. Mullen and E. M. Reighard.

Simplex Tire Co., Inc., New York; capital, $10,000; incorporators: Arthur H. Birn, Charles H. Meyer and George Eiseman.

The Alling Rubber Co. of Albany, N. Y., filed a notice of an increase in its capital stock from $150,000 to $250,000.

Royal Tire & Supply Co., Akron, Ohio; capital, $10,000; incorporators: W. E. Renneckar, M. L. Renneckar, J. O. Surbey.

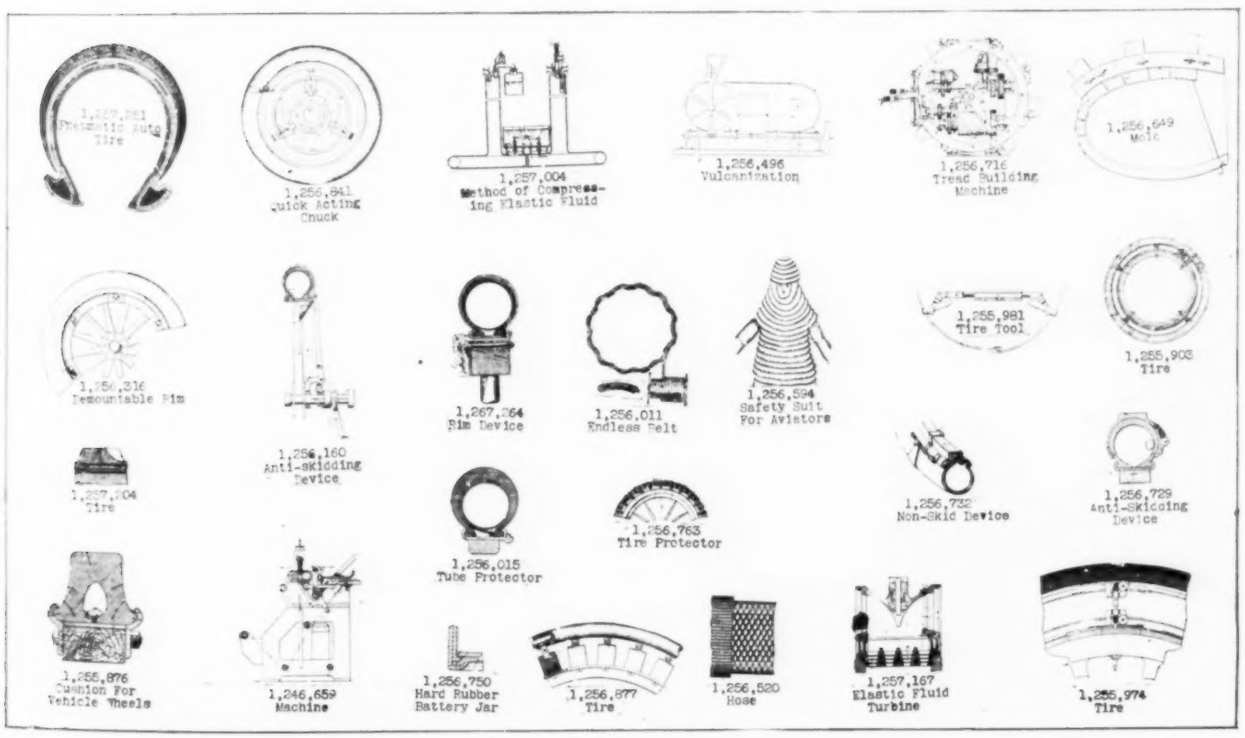
Kobut Rubber & Tire Co., Gallipolis, Ohio; capital, $100,000; incorporators: C. G. Clark, Paul Dye, John V. Dale, A. S. Richardson.

Worth-More Tire Co., Inc., New York; capital, $20,000; to deal in tires, tubes, etc.; incorporators: F. Eisele and S. A. Paul.

Olympic Rubber & Metal Co., Inc., New York; capital, $40,000; to deal in old metals, waste, etc.

Daniel S. Howard Dies

Daniel S. Howard, vice-president of the Mayflower Rubber Co., South Braintree, Mass., died on Feb. 12 at Washington, D. C., after five weeks' illness with typhoid fever. Mr. Howard was president of the Emerson Fabric Co., of Rockland, Mass.



The Philadelphia Rubber Works Company

Standardized Quality

Reclaimed Rubber

Manufactured By

MARKS PROCESS MITCHELL PROCESS

Akron, Ohio

New York Office:
52 Vanderbilt Ave.

Philadelphia, Pa.
1305 Land Title Bldg.

Classified Buyers' Index To Rubber Factory Equipment

Below is printed an alphabetical list of the principal machinery and other equipment used in rubber factories, compiled from information supplied by the manufacturers. The key symbols placed after the items refer to the names of the manufacturers that make them, as shown in the list of Manufacturers of Rubber Factory Equipment, that is printed elsewhere on this page.

Accumulators, A11, B23, F3, T31, W31.
Autoclaves, A11, B31, D15, E11, S55.

Balances, B7, E11, S19, T27.
Bins, Stock, O3.
Blocks, Pillow, A11, F3, T43.
Blowers, Tube Splicing, G3.
Boilers, **Steam,** S31.
Boosters and Exhausters, A3.
Boxes, Compound, O3.
Brands, Aluminum, D19.
Brakes, T43.
Brushes, O7.
Buckets, D27.

Cages, D27.
Calenders, A11, F3, S31, **T43.**
Calenders, Embossing, F3, H11, T19, T43.
Cars, Shoe, O3.
Carton Filling Machines, W23.
Carton Making Machines, W23.
Castings, A11, B3, B23, B31, D27, F3, M3, T31, T43, W31.
Chemical Apparatus, B31.
Chucks, S47.
Clutches, Brake, F3, T43.
Clutches, Friction, F3.
Clutches, Magnetic, F3, **T43.**
Compressors, Air, S31, T31.
Condensers, D15, S55, T31.
Conveyors, D27.
Cores, Tire, A11, **B3, T31, J3.**
Couplings, **Power,** T43.
Crackers, **A11,** F3, T43.
Cranes, D27.
Cutters, Baby Carriage Tire, W23.
Cutters, Band, A11, **E3,** H31, R7.
Cutters, Bias, W23.
Cutters, Duck Plug, W23.
Cutters, Gaskets, A11, H11, H31.
Cutters, Raw Stock, W23.
Cutters, Rubber Stock, H19, H31, R7, T11.
Cutters, Scrap, A3, T11.
Cutters, Strip, E3, F3.
Cutters, Tubing, W23.

Devulcanizers, B11, D15.
Dies, A11, D19, **H11, D19.**
Die Sinking, A11, D19, H11.
Dies, Cutting, D19, H11.
Digestors, D15.
Dipping Machines, O3.
Doubling Machines, F3, **T43.**
Doubling Machines, Fabric, T17.
Drills, D27.
Drives, A11, D27, F3, **T43.**
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Manufacturers of Rubber Factory Equipment

THE RUBBER AGE AND TIRE NEWS will gladly supply information regarding the addresses and products of the following manufacturers of Rubber Factory Equipment.
The advertisements of concerns whose names appear in bold face type will be found in this issue of THE RUBBER AGE AND TIRE NEWS.

A 3—Abbe Engineering Co.
A 7—Adams, John J.
A 11—Adamson Machine Co.
A 15—Adamson Mfg. Co.
A 19—Air Utilities Co., Inc.
A 23—Akron Rubber Mold & Machine Co. See Advertisement on Page 560.
A 27—Allen Machinery Co.
A 31—Alvey-Ferguson Co.
A 35—American Process Co.
A 39—American Rotary Valve Co.
A 43—American Tool & Machine Co.
A 47—Arthur Vulvanizing Machine Co.
B 3—Banner Machinery Co.
B 7—Becker, Christian, Inc.
B 11—Biggs Boiler Works Co.
B 15—Birmingham Iron Foundry. See Advertisement on Page 520.
B 19—Bonnett Co.
B 23—Boomer and Boschert Press Co. See Advertisement on Page 560.
B 27—Bristol Co.
B 31—Buffalo Foundry & Machine Co.
C 3—Cameron Machine Co.
C 7—Cell Drier Machine Co.
C 11—Champion Shoe Machine Co.
C 15—Chernack Mfg. Co.
C 19—Chicago Mold & Machinery Co.
C 23—Edred W. Clark.
C 27—Colonial Sign & Insulator Co.
C 31—Continental Rubber Works.
C 35—Cox, Geo. P., Last Co.
C 39—Crane Co.
C 43—Curtis & Marble Machine Co.
C 47—Cutler-Hammer Clutch Co.
C 51—Cutter, G. A., Sales Agent.
C 55—Cylinder Mfg. Co.
D 3—Davis, G. M., Regulator Co.
D 7—Day, J. H., Co.
D 11—De Mattia Bros.
D 15—Devine, J. P., Co.
D 19—Die Sinking & Machine Co.
D 23—Dings Magnetic Separator Co.
D 27—Duncan, J., Co.
E 3—Eastman Machine Co.
E 7—Eggers, William, & Sons.
E 11—Elmer & Amend.
E 15—Esterline Co.
F 3—Farrel Foundry & Machine Co. See Advertisement on Page 518.
F 7—Ford Chain Block & Mfg. Co.
G 3—Gammeter, W. F. See Advertisement on Page 560.
G 7—Garvin Machine Co.
G 11—General Electric Co.
G 15—Goodnow, L. H., Foundry Co.
H 3—Hartford Special Machinery Co.
H 7—Haywood Tire & Equipment Co.
H 11—Hoggson & Pettis Mfg. Co. See Advertisement on Page 556.
H 15—Hollander & Johnson.
H 19—Holmes Bros.
H 23—Housatonic Machine & Tool Co. See Advertisement on Page 562.
H 27—Hunter Dry Kiln Co. See Advertisement on Page 557.
H 31—Hyde Manufacturing Co. See Advertisement on Page 557.
J 3—Jones & Kuhlke. See Advertisement on Page 562.
J 7—Judson Cutlery Co.
K 3—Knott, L. E., Apparatus Co.
K 7—Kohl Mfg. Co.
L 3—Lander Last Co.
L 7—Landis Machine Co.
L 11—Lenz & Naumann.
L 15—Link Belt Co.
L 19—Lloyd, John, Co.
L 23—Lobdell Car Wheel Co.

Manufacturers of Rubber Factory Equipment—Continued

M 3—McFarland Foundry & Machine Co.
M 7—McGrory, Philip.
M 11—Mahlow & Wykoff.
M 15—Mason Regulator Co.
M 19—Miller, Chas. E.
M 23—Morse Chain Co.
M 27—Myers, F. E., & Bro.
N 3—New England Butt Co.
N 7—Norton, M., & Co.
O 3—Ornamental Iron Works Co.
O 7—Osborn Mfg. Co.
P 3—Pierce Wrapping Machine Co.
R 3—Raymond Bros., Impact Pulverizer Co.
R 7—Richard Co., Inc., Stephen.
R 11—Riehle Bros., Testing Machine Co.
R 19—Ross, Charles, & Son Co.
R 23—Rossman, Roy G.
R 27—Royle, John, & Son.
S 3—Sargent, E. E., & Co.
S 7—Schaefer & Budenberg Mfg. Co.
S 11—Schuchardt & Schutte.
S 15—Scientific Materials Co.
S 19—Scott, Henry L., & Co.
S 23—Sessions, J. H., & Sons.
S 27—Shaler, G. A.
S 31—Shartle Machine Co.
S 35—Shoe Hardware Co.
S 39—Singer Sewing Machine Co.
S 43—Smith-Backmann Machine Co.
S 47—Smith Co., James M.
S 51—Southwark Foundry & Machine Co.
S 55—Stokes, F. J., Machine Co.
S 59—Summit China Co.
T 3—Tagliabue Mfg. Co.
T 7—Taylor Instrument Co.
T 11—Taylor, Stiles & Co.
T 15—Terkelsen & Wennberg.
T 19—Textile Finishing Machine Co. See Advertisement on Page 561.
T 23—Textile Machine Co.
T 27—Thomas Co., Arthur H.
T 31—Thropp's, John E., Sons Co.
T 35—Trefethen, F. L.
T 39—Troemner, Henry.
T 43—Turner, Vaughn & Taylor Co. See Advertisement on Page 561.
U 3—Utility Mfg. Co.
V 3—Venn, Frank.
W 7—Werner & Pfleiderer Co.
W 11—Westinghouse Electric Mfg Co.
W 15—Williams Foundry & Machine Co.
W 19—Williams Patent Crusher & Pulverizer Co.
W 23—Wills, Arthur J.
W 27—Wolff Co.
W 31—Wood, R. D., & Co.
W 35—Work, Joseph W.

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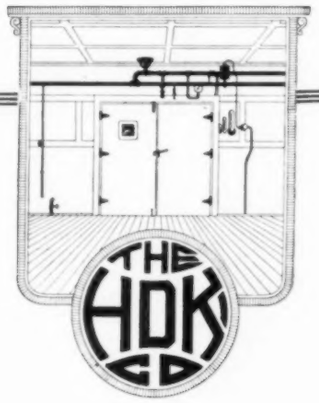

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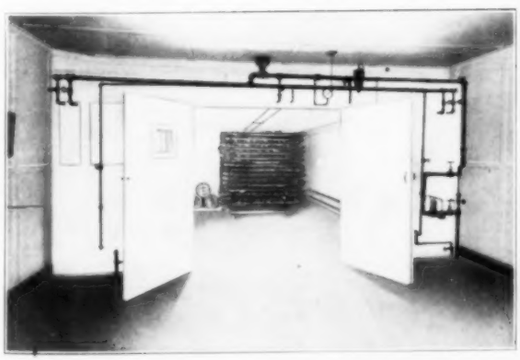

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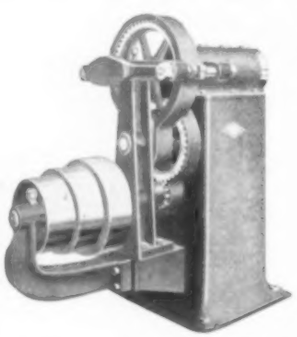

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CHEMIST WANTED—By druggists' sundry factory, in the East. Must be experienced analyst and compounder. State age, experience and compensation expected. Confidential. Address Box 72.

FOR SALE—Limited amount used rubber machinery. Address By-Products Dept., Goodyear Tire & Rubber Co., Akron, Ohio.

SUPERINTENDENT wanted for rubberizing plant. Young, technically trained man preferred, who can handle labor and who is familiar with rubberizing compounds and processes. A splendid opportunity for advancement. State full experience in reply. Address Box 71.

PRESS ROOM FOREMAN WANTED—MUST BE EXPERIENCED ON both hydraulic and hand presses in the moulding of large and small druggists' sundry work, including water bottles, etc. Able to draw specifications for moulds and to handle help. State age, experience and salary expected. Address Box 73.

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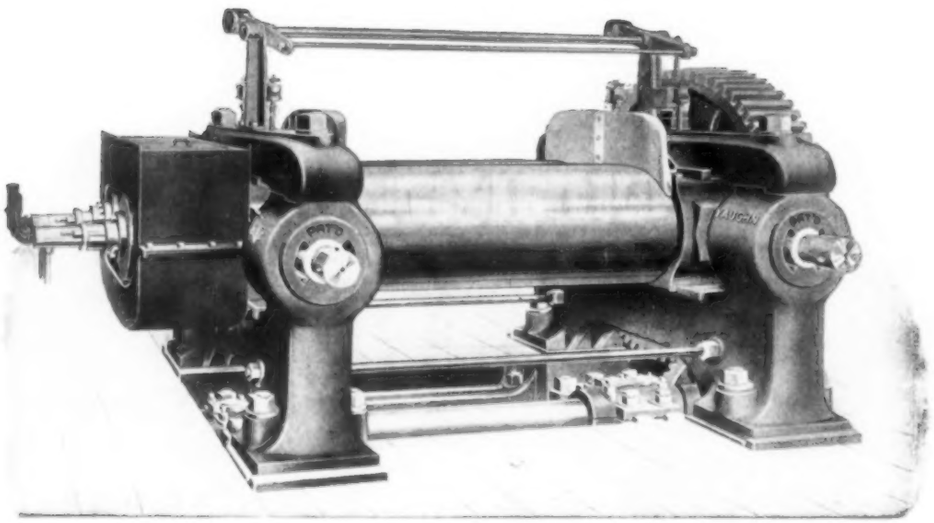

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